BBC MICRO·MASTER·ELECTRON·ATOM

£1·25

ACORN USER

AUGUST 1986

BIGGEST AND BEST-SELLING BBC/ACORN MAGAZINE

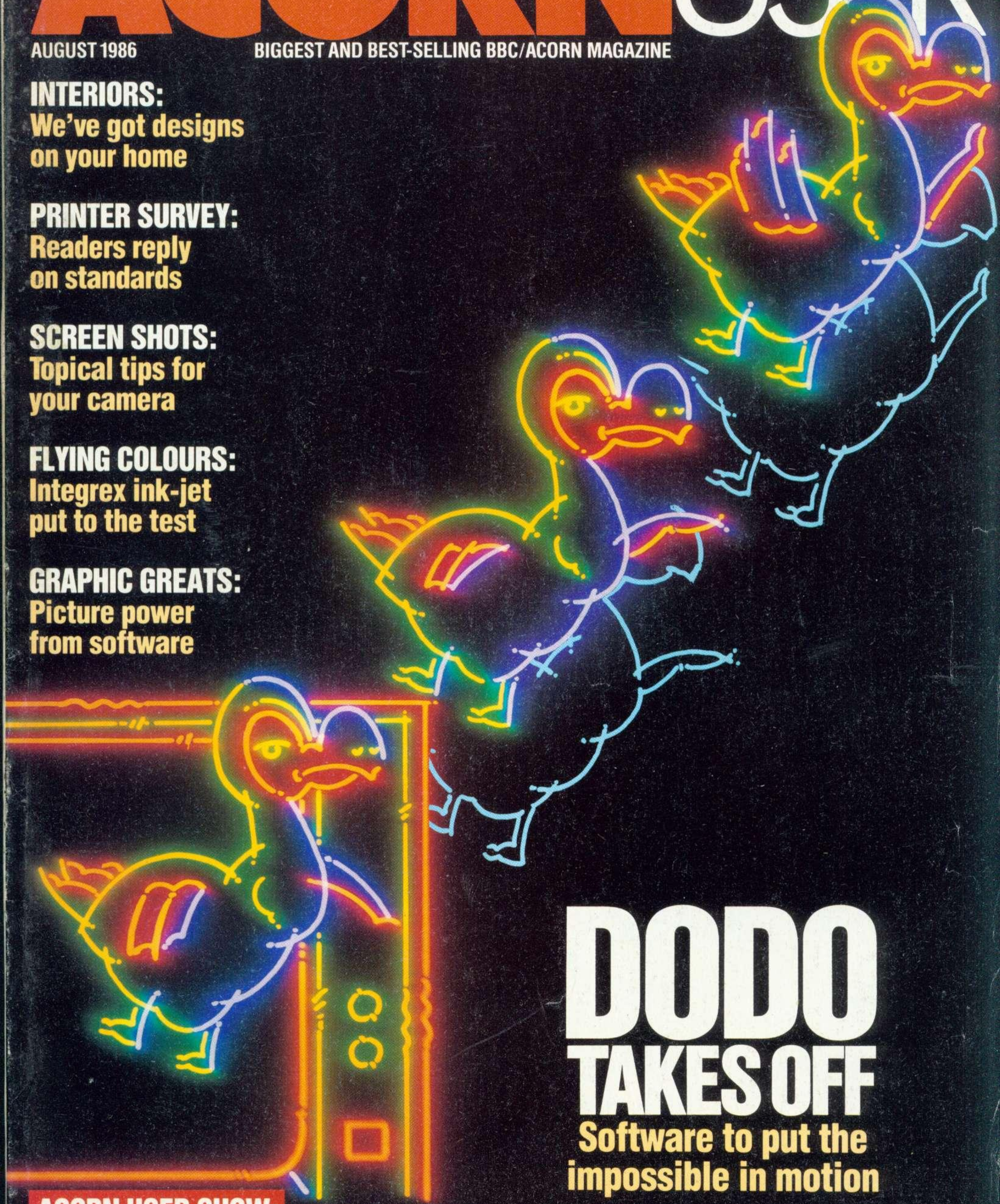
INTERIORS:
We've got designs on your home

PRINTER SURVEY:
Readers reply on standards

SCREEN SHOTS:
Topical tips for your camera

FLYING COLOURS:
Integrex ink-jet put to the test

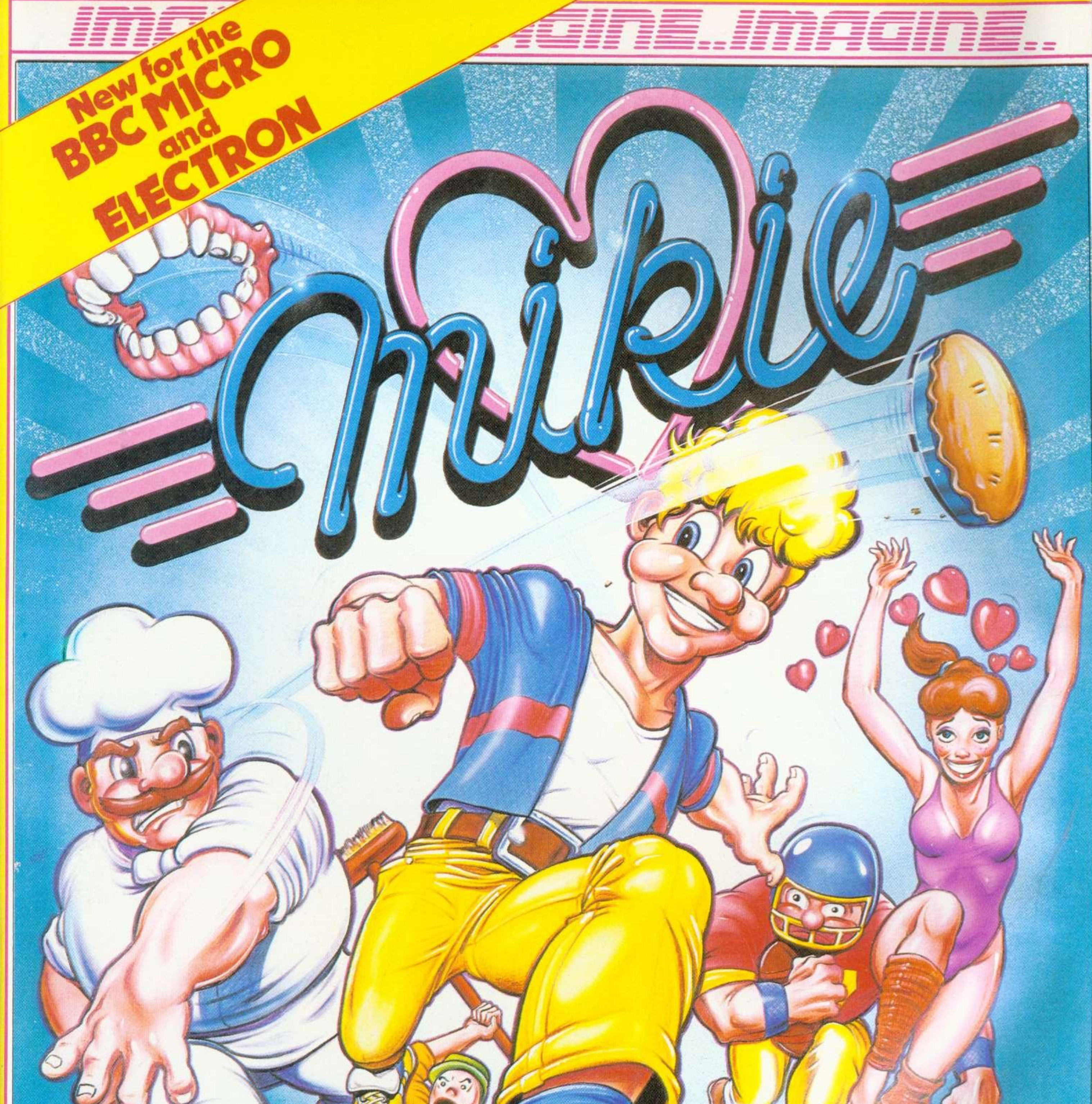
GRAPHIC GREATS:
Picture power from software



DODO TAKES OFF

Software to put the impossible in motion

ACORN USER SHOW:
Full guide inside



IMAGINE..IMAGINE..IMAGINE..
New for the
BBC MICRO
and
ELECTRON
Mikie
WAK ELIN
Imagine
..the name of the game
The officially endorsed version of the No.1 arcade game by
Konami

MICRO MEDIA Computer Supplies

0707 52698 or 0707 50913

Rydal Mount, Baker Street, Potters Bar, Herts EN6 2BP



MM 100N 5¼ x 100



MM 70L 5¼ x 70



MM50L 5¼ x 50

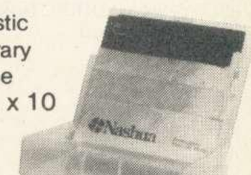


MM40L 3½ x 40



Rexel Mini Disc Box 30.

5¼ x 30
Brown smoked
Tilt lid. Cream plastic base



Plastic Library Case 5¼ x 10

UNBRANDED 5¼″ DISCS

Certified lifetime warranty
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Prices per 10 Discs	Tracks	10+	30+
SS/DD	40	7.50	6.80
DS/DD	40	9.00	8.20
DS/DD	80	9.50	8.70

3M 5¼″		Lifetime	Guarantee
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DS/DD	40	14.00	13.20
SS/DD	80	17.50	15.50
DS/DD	80	18.70	16.50

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SS/DD	135	21.90	18.50
DS/DD	135	30.20	25.50

VERBATIM DATALIFE			
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DS/DD	40	15.80	15.40
SS/DD	80	15.80	15.40
DS/DD	80	20.50	20.10

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Continuous fanfold sprocket fed	Price per 1000 1,000	2,000+
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	2,000
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COMPUTER PAPER

Plain, fanfold, micro perf edges

Size	Weight gsm	1000s per Bx	Price per box 1 box	2 Bxs+
11 x 9½	60	2	13.00	12.20
	80	2	16.20	14.60
EXACT A4	70	2	21.50	18.90
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EXACT A4 Fixed Tractor Feed				
11⅔ x 9½	80	1	16.75	14.20
	100	1	29.00	27.50

PRINTER LEAD

Centronics lead to connect BBC to EPSON KAGA CANON etc

1 mtr – 6.50
2 mtr – 8.50

SWIVEL BASES

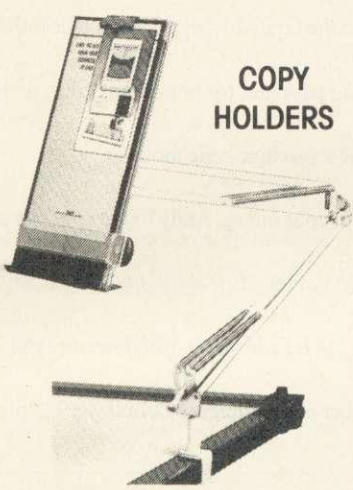
FOR MONITORS



Pan tilt revolves around 360°
12.5° tiltable up and down
Adjustable by inside screw.

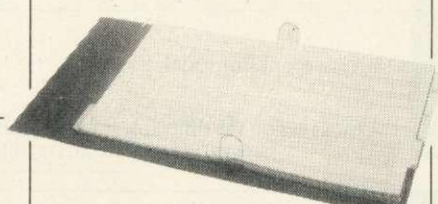
12″ MONITORS	£14.00
14″ MONITORS	£16.00

COPY HOLDERS



Adjustable arm desk clamping
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Desk top with detachable line guide
£11.00

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Adjustable hardback ring binder
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40mm paper capacity
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CANON PW1156/1080	3.40	2.90
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6100 SS	1.60	1.30
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SHINWA CP 80 M/S	4.00	3.20
SMITH CORONA		
EL 1000/2000 M/S	8.50	7.90
Fabric	3.90	3.60
Correctable	5.00	4.70
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Red Brown Blue	2.40	2.00
NL 10	5.60	4.90
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DISC MAILERS

Price each	50+	100+
Rigid Cardboard holds up to 3 discs	40p	28p

DISC BOXES

MM 100	5¼ x 100	11.90
MM 70	5¼ x 70	10.90
MM 50	5¼ x 50	8.90
MM 40	3½ x 40	8.90
Mini Box Rexel	5¼ x 30	5.00
Library Case	5¼ x 10	1.50

All MM boxes anti-static with lock.

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5¼″ Head Cleaning Disk with 15ml cleaning solution 5.50

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-MICRO MEDIA-MICRO MEDIA-MICRO MEDIA-MICRO MEDIA-

ACORNUSER

ISSUE No 49 AUGUST 1986

NEW USERS

REVIEWS

BUSINESS

EDUCATION

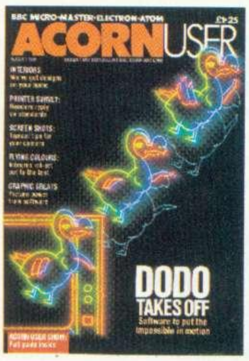
REGULARS

Subscriptions: Contact Christine Allen, Redwood Publishing Ltd, Lambourn Woodlands, Newbury, Berks. Tel: (0672) 40888. UK £17.50; Europe £25; Middle East £30; Americas, Africa £35; rest of the world £40 (prices include p&p for 12 issues). Published by Redwood Publishing Ltd, 141-143 Drury Lane, London WC2B 5TF. Tel: 01-836 2441. Printed by Watmoughs Ltd, Bradford. Typesetting and colour reproduction by Publishers Reprographic Services, London. Print production by Aquarius Print and Design, London. Distributed to the news trade by Comag, Tavistock Road, West Drayton, Middlesex UB7 7QE.

ABC
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FEATURES

COVER



Cover illustration by Stuart Briers, photograph by Roger Phillips

NEXT MONTH

AMAZING!
Track down the treasure in our maze game

Calligraphy: design your own typefaces

Sideways RAM: beat your micro's memory

Master 512: Bruce Smith gets under its lid

BRITISH BROADCASTING CORPORATION
MASTER SERIES MICROCOMPUTER

BRITISH BROADCASTING CORPORATION
MASTER SERIES MICROCOMPUTER

BRITISH BROADCASTING CORPORATION
MASTER SERIES MICROCOMPUTER

MASTER 128 – NOW AVAILABLE

Master 128	**489.00 (s)**
Turbo Upgrade	**119.00 (c)**
Master Econet Upgrade	**47.00 (c)**
Eprom Cartridges	**14.95 (a)**
Master Ref Manual Pt I	**14.95 (a)**
Master Ref Manual Pt II	**14.95 (a)**

Free with every Master sold, a disc based revolving diary showing 8 months ahead and 3 back. Allows many appointments each day and also permanent reminders to be kept. Runs from sideways ram and very easy to use.

KAGA TAXAN KP810

A top quality NLQ printer giving 150 c.p.s. draft and 27 c.p.s. NLQ. Fully FX80 compatible, friction and tractor feed as standard. Comes complete with cable and paper **249.00 (s)**

Free with every KP810 the Font design package allowing 10 pre-defined fonts or any user defined fonts to be used.

EPSON LX80

The new low-cost printer from Epson giving 100 c.p.s. draft and 22 c.p.s. NLQ. Fully FX80 compatible. Friction feed standard, tractor unit available. Comes complete with cable & paper. **225.00 (s)**

LX80 Tractor Unit	**21.00 (c)**
LX80 Cut Sheet Feeder	**56.95 (b)**

JUKI 5510

A very versatile and fast printer giving 180 cps draft and 30 cps in NLQ mode. Friction & tractor feed as standard. Fully FX80 compatible. Comes with cable & paper. **249.00 (s)**

Juki 5510 Cut sheet feeder	**235.00 (s)**

QWENDATA DWP1120 DAISYWHEEL

A low cost daisywheel giving all the facilities you need. 20 cps, 13" paper, 4 hammer settings, daisywheels are Qume compatible, 10,12,15 cpi. Comes with cable & paper. Tractor & cut sheet feeder available. **169.00 (s)**

DWP1120 Tractor unit	**109.00 (s)**

VIEW PRINTER DRIVERS

We have printer drivers available for all the above printers **7.95(a)**

FONT DESIGN

A disc based font program allowing any one of 10 pre-defined fonts or any pre-defined font to be downloaded to a Kaga KP810 or Canon PW1080A printer. The 8K ram chip (6264LP-15) must be fitted to the printer. BBC B, B+ and Master compatible. **9.95(a)**

AMX MOUSE

The mouse now comes with the new Super Art package. Now on a 16k rom it extends the original facilities to include Pull Down Menus, overlapping windows and extended Icon sets. It is now compatible with Aries ram boards, the BBC B+, DFS and ADFS. The mouse and Super Art are available either separately or as a package.

AMX Mouse with Super Art	**79.00 (c)**
AMX Super Art	**47.95 (b)**
AMX Pagemaker	**47.95 (b)**

MASTER ACCESSORIES

View 3 guide	**10.00 (a)**
Viewsheet guide	**10.00 (a)**
Viewstore guide	**10.00 (a)**
Iso-pascal (C)	**65.00 (a)**
Logo (C)	**65.00 (a)**
Lisp (C)	**56.00 (a)**

(C)–Master cartridge

DISCS

CDC 40tr s/s	**13.95 (a)**
CDC 40tr d/s	**15.45 (a)**
CDC 89tr s/s	**16.95 (a)**
CDC 80tr d/s	**18.45 (a)**
Maxell Twin Pack 40tr d/s	**4.50 (a)**
Maxell MD-2DD 80tr d/s	**22.00 (a)**

BULK OFFER ON 5" DISCS (LIFETIME WARRANTY)

10 X 40TR D/S D/D	**9.95 (a)**
10 X 80TR D/S D/D	**10.95 (a)**
20 X 40TR D/S D/D	**18.95 (b)**
20 X 80TR D/S D/D	**20.95 (b)**
50 X 40TR D/S D/D	**46.95 (c)**
50 X 80TR D/S D/D	**49.95 (c)**

SPECIAL OFFERS

Hitachi Eproms & Rams – 250 nS

27128 16k Eprom	1-9	**2.95 (a)**
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2764 8k Eprom	1-9	**2.50 (a)**
	10+	**2.30 (b)**
6264LP-15 Ram	1-9	**3.50 (a)**
	10+	**3.00 (b)**

Intel Chips

8271 controller		**40.95 (a)**
27256 32K Eprom	1-9	**5.00 (a)**
	10+	**4.25 (b)**
Acorn 8271 DFS	0.9	**48.95 (a)**
Acorn 8271 DNFS	1.2	**68.95 (a)**
Acorn 1770 DFS		**48.95 (a)**
Acorn ADFS		**28.95 (a)**

PROFIT

A complete intergrated suite of business software for the BBC B (with shadow ram), BBC B+, Master 128 or KBL128PC. The system covers stock control, invoicing, credit notes, all ledgers, petty cash and bank account control and much more.
Only **97.00 (c)**

ARTIST

The new colour graphics package from Pear Tree using the ultimate mouse – Megamouse. This powerful art package allows all the normal facilities as well as sprites of any size, pattern editing and colour exclusion. The package comes complete with a manual, rom software, system discs and an Epson screen dump.
The Artist package and the Megamouse can be bought separately or as a complete package.

Artist	**53.00 (b)**
Megamouse	**65.00 (b)**
Artist & Megamouse	**97.00 (c)**

DISC DRIVES

Mitsubishi (2yr warranty)

80tr d/s single	**132.95 (s)**
80tr d/s dual	**252.95 (s)**
80tr d/s dual + psu	**292.95 (s)**
80tr d/s dual + psu in monitor stand	**324.95 (s)**

Cumana

80tr d/s single	**154.95 (s)**
80tr d/s dual	**299.95 (s)**
80tr d/s dual + psu	**339.95 (s)**

All drives come complete with manual, cables and formatting disc.

MONITORS

Microvitec 1451 Med Res	**265.00 (s)**
Microvitec 1441 High Res	**435.00 (s)**
Mitsubishi 1404 Med Res	**265.00 (s)**
Philips CF114 TV/Monitor	**199.00 (s)**
Kaga KX1201G Green Screen	**103.00 (s)**
Kaga KX1203G Amber Screen	**120.00 (s)**
Philips 7502 Green Screen	**84.95 (s)**
Philips 7522 Amber Screen	**86.95 (s)**
Philips 7542 White Screen	**86.95 (s)**
Hantarex HX12 18MHz Green Screen	**79.50 (s)**

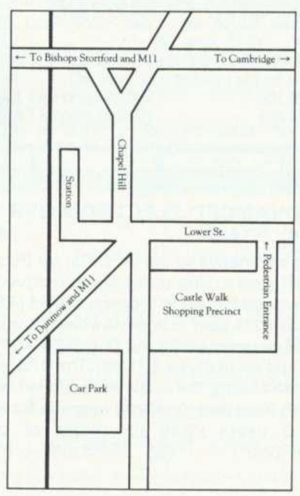
All monitors come with a BBC cable.

ROM/RAM BOARDS

ATPL Rom board	**37.95 (a)**
Peartree MR 2000 Rom board	**13.95 (a)**
Peartree MR 3000 Rom board	**17.25 (a)**
Peartree 4200 Rom board	**29.95 (a)**

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ADVANCED DISC TOOLKIT
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Any Acorn user including Master, BBC B+, Electron, DFS, 1770 DFS, ADFS, 2nd. & co-processors A.C.P.'s BEST SELLING product containing over 30 commands inc.:- powerful memory & disc editor, search memory/disc/basic, catalogue/unplug ROMS, load/run programs below page, automatic menu, file transfer (inc. locked cassette files), ADFS utils etc. etc. ("it's superb" ... Database Pubs. - "excellent value for money" .. Acorn User) (16K EPROM & FULL MANUAL)

ADVANCED ROM ADAPTOR 2
(03) /M/E+1/ — £14.95

An Acorn approved cartridge containing a card with special 'zero' profile sockets that allow you to fit compatible 8K or 16K EPROMS/ROMS. The cartridge is fully enclosed providing complete protection for your ROMS. Simple to use -no switching- complies fully to the Acorn (sideways) Rom Filing System. A.R.A.2 contains 2 sockets.... A single adaptor is also available....
A.R.A.1 (02) /E/ £10.35

ADVANCED SIDEWAYS RAM
(04) /E+1/ — £29.90

A highly versatile but simple to use s/w RAM cartridge that is automatically write protected on loading. Contains 16K RAM but can be switched (externally) to 2 X 8K RAM. Supplied with instructions & full software support (on cassette) to save ROM images to disc/tape, load RAM from file, Advanced Print Buffer & MakeRom a utility to merge several files from disc to be run from the ROM FS.
(S/Ware on disc : please add ...
£1 5¼ DFS .. £2 3½ ADFS)

ADVANCED ELECTRON DFS
(05) /E/ — £24.15

Electron & Plus 3 users ... gain BBC compatibility by adding the Advanced Electron DFS (1770 DFS) this is the same disc filing system supplied with the BBC B+. Now you can produce and access (compatible) BBC disc based software. A.C.P. also supplies 5¼" disc drives to add to your Plus 3 (inc. 2nd. drive adaptor). "ACP has produced another superb ROM for the Electron" .. Electron User Feb '86
(supplied on 16K EPROM + DFS MANUAL)

ADVANCED DISC INVESTIGATOR
(06) /M/B/E/ — £28.75

A very powerful Disc utility for standard & non-standard discs. Backup most protected discs, edit any type of non-standard disc, check & repair faulty tracks, create new disc formats, copy 40track discs to 80track discs, verify two non-standard discs.
("ADI features an extremely comprehensive sector editor, and one of the finest I've seen" ... Tublink on Prestel)
(supplied on 16K EPROM + manual)

ADVANCED ROM MANAGER
(07) /M/B/E/ — * £9.99 *

A friendly utility for ROM & sideways RAM. Examine ROM/RAMs, load files into RAM, move memory to/from SWays ROM/RAM, catalogue/kill ROMS, offer commands to specific ROMS, save ROMs to disc/tape, AUTOROM a file (inc. BASIC) to run from SWays ROM/RAM, execute specific machine code subroutine in a ROM, generate a ROM's checksum & CRC.
SPECIAL ANNIVERSARY PRICE .. LIMITED PERIOD
(supplied on EPROM + manual)

ADVANCED PLUS 4
(08) /E+1/ — £79.98

"DISC DRIVE COMPATIBILITY AT LONG LAST"... (Electron User June '86) this sums up AP4 & ACP's approach to producing products. AP4 is a fully ACORN compatible disc I/face & will accept any standard drive inc. PSU, runs 1770 DFS (as fitted in the B+ & Master), keeps page &Eøø, utils in ROM & provides a spare rom socket. "ACP's PLUS 4 comes out on top. I can recommend it to anyone..." (E.U. June '86)
...AP4 should be considered the standard interface for the Electron (AU July '86)
AP4 100 — £198.97 (inc VAT & delivery)
AP4 400 — £228.98 (inc VAT & delivery)
PLEASE PHONE FOR PACKAGE PRICE ON AP4+D/DRIVE

ADVANCED PLUS 5
(09) /E+1/ NEARING COMPLETION

A triple interface cartridge providing...
1) a TUBE i/face allowing a second processor to be connected, increasing BOTH speed & memory (PAGE &8øø HIMEM &8øøø in all modes)
2) a 1 MHz BUS for control applications & prommers
3) the USER PORT for mouse and graphic devices.
Also contains 2/3 ROM sockets and on board operating software for 2nd processor.

ADVANCED 1770 DFS
3 versions ADM (11) - ADB (12) ADE (13) — £34.50

ACP have totally re-written the Acorn 1770 DFS, enhancing existing features & adding new ones. The result is probably the fastest & most powerful disc filing system your computer could have. With the ability to operate in double density occupying both sides of a disc (640K). Automatic file relocation, improved file handling, 62 file catalogue and Sways RAM can be used as a fast RAM DISC.
(16K EPROM + comprehensive manual)

ADVANCED ELECTRON DFS Eøø
(14) /E+ASR/ — £19.99

An alternative to our AED(05) for Plus 3 and ASR users. This optional alternative DFS is designed for use in Sideways RAM (ASR) and allows the user to operate a disc filing system &Eøø when using the Plus 3 (in ADFS page would normally be &1Døø). The DFS is simply loaded using the software supplied with the ASR from disc. (optional upgrade for existing AED users £9.50 on return of original EPROM) (3½" ADFS disc + manual)

OTHER PRODUCTS & SPECIAL OFFERS

VIEW cartridge	(101)	/E+1/	£15.00
Vsheet "	(102)	/E+1/	£15.00
VIEW & VSHEET	(119)	/E+1/	£25.00
LISP cartridge	(103)	/E+1/	£ 9.99
E/Adv User Guide	(104)	/E/	£ 4.95
TURTLEgrhpCASS	(105)	/E/	£ 3.99
LOGO cartridge	(106)	/E/	£44.95
PASCAL cartridge	(107)	/E/	£44.95
VIEW pack BBC	(118)	/B/	£49.00
AP4 100	(140)	/E+1/	£198.97
3½" discs in 1/box	(120)	/M/B/E/	£24.00
5¼" discs ds/dd "	(121)	/M/B/E/	£12.99
5¼" discs ss/sd	(122)	/M/B/E/	£ 8.99
3½" disc drives	(please call for price)		
5¼" disc drives	(please call for price)		
2nd. Drive Adaptor	(130)	/E+3/	£ 7.95
3½" library box10	(124)		£ 2.95
16K EPROMS	(131)		£ 3.75
VIEWSTORE	(117)	/M/B/(e)	£57.95
AP4 400	(141)	/E+1	£228.98

Equipment codes /M/ = Master /B/ = BBC /E/ = Electron /E+1/ = Electron + Plus 1

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NEWS

Download all AU from Micronet

For those people who just can't wait, *Acorn User* listings can now be downloaded from Micronet 800. That means you don't have to send for the monthly disc and suffer the vagaries of the post or spend hours typing them in.

The first bunch of listings to be made available are those on the July disc. These include Joe Telford's word search program, the help utility from Barry Ambrose, Mandelbrot patterns by David Johnson-Davies and a *View* text spooler from Graham Bell.

These listings would cost £5.75 on disc. Downloaded from Micronet, the price is just £5. The whole lot comes as five files, and information on the programs and how to download them starts on Micronet page 600600530.

Prestel could go free for a day

Prestel might become free for a day, if a Dutch Acorn user group gets its way. And the same enthusiasts want to link together all the viewdata systems in Europe.

The group responsible for this innovative lead in European communications is the Big Ben club. It recently persuaded the Dutch viewdata system, Viditel, to throw open its database for day so that people could log on for free. The day was so successful that the Viditel switchboard was practically jammed.

Next year, the Big Ben club hopes to go one better by bringing together all the European viewdata networks for one day.

No objections

Peter Probert of Micronet told *Acorn User:* 'I wouldn't object to something along those lines. If we were approached we would certainly be interested.'

Prestel already allows free access to a demonstration database. Graham Jones, Prestel's General Manager, feels it may be possible to enlarge this for a special event.

'I'm not sure what the technical problems are,' he told us. 'But to make all of Prestel available we would have to block off areas that carry frame charges. And there are areas that carry premium time charges which Prestel doesn't have the right to make available.'

Prestel can be contacted at Telephone House, Temple Avenue, London EC4Y 0HL. Tel: 01-822 1122. Micronet 800 is at 8 Herbal Hill, London EC1R 5EJ. Tel: 01-278 3143.

Adventure for Elk

Electron users who have jealously watched Beeb owners playing the *Enthar Seven* adventure will be pleased to hear that they are getting their own version.

It comes on 5.25in disc and is compatible with the ACP 1770 disc interface, running in mode 6. The price is £16.95 for a single 80 track disc, or £17.95 for two 40 track discs.

Details from Robico Software, 3 Fairland Close, Llantrisant, Mid Glamorgan CF7 8QH.

Low-cost video

Dalroth Computer Products has produced a low-cost version of its interactive video system.

Designed to run on a BBC micro and a range of VHS and U-matic videotape players, the system features full control of the VTR features. Its main use is in producing training programmes.

Contact Dalroth at Dalroth House, 12 Gloucester Place, London W1H 3AW. Tel: 01-935 2983.

Master problem doused

Acorn has admitted problems with the lithium batteries fitted to Master computers, and is now busy replacing them.

An incident in a Norfolk hospital, where a battery malfunction resulted in a 'minor conflagration', alerted Acorn to the problem. It appears that under certain conditions the lithium cells can suffer reverse charging, leading to overheating.



Master: battery malfunction

Peculiar

Jeff Gorton, Services and Training Manager for Acorn, stressed that the incident was a result of a 'peculiar combination of conditions. There were flames for a few seconds but these were quickly extinguished.'

The lithium cells are now being replaced with alkaline batteries. These come in the form of three cells in a sealed pack which sits to the left of the main board – a space originally reserved for an internal modem. A new battery nest is also supplied. New Masters will be designed around these batteries.

Acorn is using the dealer network to issue replacement batteries for all Master 128s and ETs issued before 31 May 1986. New batteries are being sent to customers who obtained machines direct from Acorn. The replacement is completely free, and, although you can make the change yourself, dealers will do it without charge.

If you are unsure about the battery in your Master, contact Acorn on (0223) 214411. In the meantime, the company suggests that Masters are turned off when not in use.

Trivial Pursuit's advance success

As if there wasn't enough trivia in the computer world already, Domark has brought out a computer version of the game that is the scourge of dinner parties everywhere – *Trivial Pursuit.*

The family quiz game that has caused divorces has been accurately recreated, with the questions being taken from the Master Genus Edition of the original board game. However, there are some additions which make use of the sound and graphics capabilities of the computer.

The title is assured of success. Already the game has built up advance orders of 40,000. The release date is planned for September, and the software will cost £14.95.

Incidentally, did you know that if you stacked all the copies of *Trivial Pursuit* on top of each other, they would reach 3027 miles into the sky?

THE MAN FROM U.N.C.L.E.

Scenario: High Street store. Euthymol Gall in attendance at the computer section. Enter callow youth, laden with greenbacks. Euthymol's dicky-bow spins with delight as he notices the swelling in the young man's breast pocket.

'Good day, young Sir. That's a nasty inflammation of the wallet. How may we ease it for you? A little three-card brag? Pitch-and-toss in the staff rest room? Or would you prefer to drag away one of our cardboard boxes.'

The young chap smiles and speaks. 'Actually I'm after a new computer. One of those 16-bit ones with the cracking Motorola 68000 chip I keep reading about.' Gall's visage darkens. 'Sixteen bit! Heaven forfend, dearest sir. That's too many. All those bits. How can one keep track of them? Think of the maintenance costs. No, light of my life, 8-bits are enough for any man.'

At this point he steers the lad towards the Acorn Corner. Wringing his hands he nods respectfully towards a New Machine. 'Behold. The answer to all your prayers. The Baby Beeb, sprung from the loins of the Master. Eminently suitable for a young gentleman wishing to make a careful purchase. The latest compact micro with free disc drive and monitor.' The boy frowns. 'Compact? What does that mean?'

'Ah, well, all those things you never use, like industry standard interfaces and provision for expansion have been removed to make life easier for me – I mean you. Rather like the Amstrad, except better of course. At 600 sponduliks it's a snip. All your friends will envy you. Come back, sir. Let me just look at the money. I won't touch it, honest.'

Electron on the up



Electron: disc interfaces could make it more popular than the Beeb

The latest in what seems like a flood of Electron products is the Plus 5 from Advanced Computer Products, which gives Elk owners access to second processors. The interface also includes a user port and 1 MHz bus, like those found on the BBC micro.

The Electron is enjoying a surge of popularity following a series of quite dramatic price reductions. Superior Software reports that sales of BBC titles only just keep ahead of Electron sales by virtue of the large market among Beeb owners for disc-based software. With the increasing number of Elk disc interfaces, this could change. Other software houses are finding that Electron games form as much as 75 per cent of their Acorn-based sales.

Hardware sales are also up. the Plus 5 interface will take standard Acorn second processors. The main benefit is extra memory, particularly with programs such as *View* where mode 3 often uses too much screen memory.

With the Plus 5, PAGE is always at &800 and HIMEM at &8000, with the screen memory handled by the computer itself. It is also much faster.

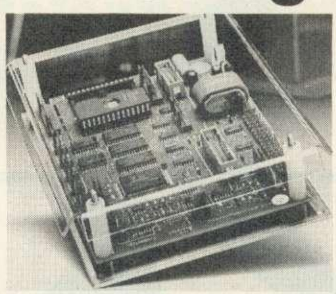
The user port is hardware compatible with the BBC micro, although software will often need changing. ACP, for example, has a modified version of the AMX mouse ROM running on the Electron, using the mouse plugged into the user port.

The 1 MHz bus is similarly compatible. The company is releasing an EPROM programmer aimed mainly at the BBC/Master market, but which will also run on the Elk with this interface fitted.

ACP hopes the Plus 5 will sell for £50 to £60.

ACP, 6 Ava House, High Street, Chobham, Surrey GU24 8LZ. Tel: (0276) 76545.

Robot with a sting



Scorpion: turns Beeb into an add-on

A tiny computer that turns your Beeb into a peripheral is Micro-Robotics new product.

The Scorpion controller is an intelligent interface device with its own processor, 24k of RAM and programming language. It carries a host of interfaces to link with devices such as cameras, sensors, servos, keypads – in fact, just about anything.

The most important interface is a serial port which connects to the RS423 port on the Beeb. All you need is a simple communications program. Your Beeb then becomes a dumb terminal connected to the Scorpion.

The 32k system chip on the Scorpion contains a sophisticated programming language, similar to Pascal, with procedures, functions and multi-tasking, but containing specific commands to access the various interfaces. Once your programs are written, the Scorpion can be disconnected from the Beeb and will then run on its own, from the mains or batteries. Possible applications range from manufacturing to scientific experiments, and education to burglar alarms.

The device costs £249 (plus VAT) and a wide range of sensors and add-ons is available. Contact Micro-Robotics on (0223) 323100.

Inter series on one chip

Computer Concepts is to produce an all-in-one cartridge for the Master containing the four main modules of the Inter series of business software. And a single chip version for other BBC micros should follow.

The cartridge incorporates *InterWord, InterSheet, InterBase* and *InterChart,* plus an extra manual giving additional details about the procedures for linking the modules, and the company hopes to sell the package for around £100 plus VAT.

The package is based on a 128k ROM chip. Although it contains eight times as much memory as standard packages, the new chip looks like an ordinary ROM to the computer. Special decoding systems make it possible to switch between the different programs.

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These are complete disc drive systems for the BBC micro – No extras required. Both our systems combine the very latest in Japanese disc drive technology with the unbeatable Opus 2-year guarantee. With super reliable direct drive mechanisms, low power consumption and fast track to track access times they represent fantastic value.

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Our sale prices even include VAT, 2-year warranty and guaranteed 72-hour FREE delivery. You won't buy better, you can't buy cheaper, but hurry we can't hold these prices for ever! To order your system simply post the coupon or ring Opus now on 0737 65080 – we'll give you full details of the other disc drive bargains in our range. Generous education and dealer discounts – enquiries to Martin Brefitt on our main Opus number 0737 65080

Technical aids from Pineapple

Pineapple Software has two new products for the technically minded. A utilities disc for the *Diagram* drawing software, at £11.50, makes it easier to find your way around *Diagram's* many screens.

There is also a program for designing printed circuit boards called *PCB* at £97.95. It is compatible with the Master.

Diagram has recently been updated and a new version is available which will work with the Master and ADFS.

Details from Pineapple Software, 39 Brownlea Gardens, Seven Kings, Ilford, Essex IG3 9NL. Tel: 01-599 1476.

Tubelink grows

Tubelink, the area of Viewfax for Beeb owners with a bit extra, is two years old. It now caters not just for second processor owners but also Music 500, sideways RAM and Pascal users, and there is a new section for the Master.

Queries are answered within 24 hours. But if you haven't got access to Prestel you can still get Tubelink services by post.

Tubelink is edited by 16-year-old Benjamin Rietti. Details from: Tubelink By Post, PO Box 641, London NW9 8TF.

School register

A new database software package from Peartree is *Schools Administration*, which can store details for 1000 pupils, including their subject and background. (Users will probably have to register under the Data Protection Act.)

It runs on all BBC micros and costs £125. Tel: (0480) 50595.

Quiet printing

Power Equipment's new printer silencer is a padded cabinet which is claimed to cut noise by 90 per cent. Price £255 plus VAT.

Power Equipment Ltd, Kingsbury Road, London NW9 8UU. Tel: 01-205 0033.

Put some colour into your micro

A new video interface card gives BBC micro owners a choice of 4096 colours, any 16 of which can be used on a mode 2 screen at one time. (This doubles the number of combinations offered by the CTS colour card mentioned on page 11 of last month's issue.)

The card comes from Wild Vision – a company best known for sophisticated computer vision systems.

To install the device you remove the video ULA chip and plug the board into the socket. One problem that has cropped up is that some Master micros appear to have the ULA soldered in. That makes the operation much trickier, and in those cases it will have to be carried out by accredited service centres only – unless you're extremely nifty with a soldering iron and don't mind violating your guarantee.



Wild Vision card: offers 4096 colours

Output is through the standard RGB socket and into a suitable monitor, although a mono image, with a wide range of grey tones, can also be obtained through the composite video port.

Easy to install

Using the card is much easier than installing it. No special software is needed. Most of its power can be accessed easily from Basic using the VDU19 command.

The card is expected to appear in early August, and although no price has been fixed, it is likely to retail at between £100 to £150.

Meanwhile, another company which has been adding colours to the Beeb is Solidisk. Its STL colour ROMs are extra boards which behave like sideways ROMs, but which give users access to a 'mode 8'.

The Colour 1, at £40, has 16k of display memory, and gives eight colours in 40 column modes, and four colours with 80 column modes. The Colour 2, which will sell for £150, uses 128k of memory, giving four times the number of colours. User RAM is left completely free for programs.

For more details contact: Wild Vision, Mari House, 20-22 Jesmond Road, Newcastle Upon Tyne NE2 4PQ. Tel: 091-281 7861. Solidisk is at 17 Sweyne Avenue, Southend SS2 6JQ. Tel: (0702) 354674.

Tap into the telephone network with this book

A new edition of the *Hackers Holy Grail*, by Brian Sothcott, has just appeared. In spite of its title, the book is aimed at the law abiding communications enthusiast who wants to know more about the world of the telephone network and the computers attached to it.

The book comes in the form of a simple printout. For £12.50 it contains a wealth of information, particularly on the workings of the phone system itself. There is even a program listing in BBC Basic which forms the basis of a useful autodialling routine.

Sensibly, the book does not try to give a full listing of all the current bulletin boards which change so rapidly. There are, however, numbers for US boards, book reviews and some handy names and addresses.

For more details contact MicroChips Computer Services, 56 Waterloo Road, Freemantle, Southampton, Hampshire.

Master mouse

New versions of the AMX mouse and *Pagemaker* software have been produced for the Master.

The *Pagemaker* software comes on three discs and is virtually identical to the original. The mouse software improvements include speed. It costs £89.95.

There is also a version of the mouse software which turns off the network in Econet machines, avoiding problems with memory.

Wordwise training pack

People puzzled by word-processing may benefit from the TVEI Wordwise Training pack. For £28, it includes training guides, exercises on disc, 60 reference cards, a prompt card and explanatory booklet.

The pack is also bundled with *Wordwise* or *Wordwise Plus* at £54 and £66 respectively.

Details from Jordanhill College Publications Unit, Southbrae Drive, Glasgow G13 1PP. Tel: 041-959 1232.

Upgrade your Termulator free

Owners of the *Termulator* communications ROM who have recently upgraded to the Master may be interested in the latest free offer from Acornsoft.

An upgraded version has been produced which offers significant advantages over the previous software, not least in using the battery-backed CMOS RAM to store the terminal configuration. And the numeric keypad on the Master means that it can more closely emulate a VT100 terminal. Numerous other terminal types can also be emulated.

An Acornsoft spokesperson said that the ROM will be offered as a free upgrade, rather than being sold in its own right. Contact Acornsoft on (0223) 214411.

● An adventure on the cheap is now available from Melbourne House. The company has re-released *The Hobbit* on cassette at the price of £9.95 – five quid cheaper than the original version, although you no longer get the book with it. The original packaging is still available.

● A new software house with a heavy bias towards the BBC has emerged in Manchester. Riverdale's first release is a package called *Paranormal* – four programs to test your psychic abilities, character, biorhythms and any previous lives you might have had.

Another tape, available soon, is *Suds* – a four-part adventure loosely based on TV soap operas. Further information from Riverdale Software, 95 Printon Avenue, Manchester M9 3JW.

● Alligata has released a software package for all under-age and teetotal games players. *Pub Games* includes simulations of the more popular pastimes encountered in your local hostelry (except for the principal one).

There are seven games in all – bar billiards, dominoes, table football, darts, skittles and a couple of card games. The price: £9.95 on cassette. Alligata Software is on (0742) 755796.

More Beebs on the board

by Steve Mansfield

BBC micros are taking over in the increasingly popular world of bulletin board services (BBSs), and now a new organisation – the Bulletin Board Operators Association (BBOA) – has been formed, with the aim of co-ordinating BBS activity.

The availability of cheap auto-answer modems and bulletin board software – including viewdata systems like Communitel – has resulted in a proliferation of new boards run on the Beeb. But many of them die just as quickly. David Atherton, a member of BBOA, explains: 'The crunch comes after four or five months. Then the board either folds or goes on for a long time.'

Among other things, the BBOA wants to establish itself as a central negotiating force for dealing with other, large organisations, such as British Telecom. It is hoped that the BBOA will be able to give bulletin board system operators (sysops) the same status as radio hams, and there is even some talk of a licensing system for operators.

The organisation also plans to approach manufacturers in the hope of obtaining discounts on equipment for sysops, very few of whom charge for the services they provide. To contact the BBOA, write to PO Box 57, Barnet, Herts EN5 2RS.

● A couple of new boards to try: The Interface in Bromsgrove is a viewdata system on (0527) 71251; HBBS1 in Bradford runs from 4pm to 11pm on (0274) 45246.

The Breacon Beacons board is now a viewdata system known as the Electronic Tourist Board, and its number is now (0874) 730692. This free, 24-hour service carries tourist information about Mid and South Wales.

Utilities galore from Clares

A new utility package from Clares contains no less than 52 commands for discs, memory, ROMs, sideways RAM and the Tube.

Ramrod, which is Master-compatible, consists of four main areas. For discs, there are sector editors for both DFS and ADFS, in 40 or 80 column screens.

The general section includes memory editors and disassemblers which can access shadow RAM and sideways ROM/RAM banks. There is another section specifically for ROMs, including ROM filing system utilities which convert programs to RFS format. The package also makes it easier to save and load ROM images with various types of sideways RAM.

Lastly, there is a section for the Tube. In addition, there are four commands to shift memory between the I/O and second processors and compare sections of memory in both.

The package costs £40 on ROM or, for those who prefer not to take up space in their micros, £35 on disc.

Sailors on the net

A new package from Sea Information Systems Ltd is designed to train junior seamen: a tutor at a BBC micro selects charts for any part of the British coast, and this information is fed to students at up to 27 teaching stations, linked by Econet (right). The students control vessels ranging from yachts to supertankers, and even hovercraft. The tutor can set sea and wind conditions and introduce other vessels into the location for the student seamen to cope with. The software costs £5000, and the company can be contacted at 25 Portview Road, Avonmouth BS11 9LB. Tel: (0272) 824369.



Cartridges for the Master

While Acorn ROM cartridges for the Master continue to be hard to find, other manufacturers are filling the gap.

Viglen already makes plug-in cartridges for the BBC micro which take a single ROM. Now an adaptor for the Master has been produced which takes two standard Viglen cartridges. As the Master has two sockets, this means that up to four ROMs can be fitted at the same time.

The adaptor should make its first appearance at the Acorn User show. The price (probably slightly cheaper than the Acorn product) has yet to be fixed.

Viglen can be contacted at Unit 7, Trumpers Way, Hanwell, London W7 2QA. Tel: 01-843 9903.

Advanced Computer Products also has a cartridge, originally designed for the Electron. The ARA II can hold two ROMs, either 8k or 16k. The price is £14.95. More details from ACP, 6 Ava House, High Street, Chobham, Surrey GU24 8LZ. Tel: (0276) 76545.

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* All prices are for UK only and inclusive of VAT   * Offer is subject to availability

News in brief

● The annual conference of the Microcomputer Users in Education (MUSE) organisation is being held at Nottingham University on 28-30 July. The cost is £62.62. There are three main lectures and a wide variety of smaller sessions from which delegates can choose the six of greatest interest to them.

Details from MUSE, PO Box 43, Houghton on the Hill, Leicester LE7 9GX. Tel: (0533) 433839.

● AVP Computing, which publishes over 140 educational titles for the BBC micro, has confirmed that all its software will run on the Master, except *EDG Graphics Package, Biology Simulations* and *Blocko Quiz Package*, which are currently being converted. AVP Computing, Hocker Hill House, Chepstow, Gwent NP6 5ER. Tel: (02912) 5439.

● Wilson Software has updated its library loans management package. *Librafile II* can cope with up to 2000 pupils and you are given the option to use a bar code reader in place of the keyboard.

The software comes on two discs (40 or 80 track) at £37.50.

Contact Wilson Software, 34 Blackmoss Lane, Ormskirk, Lancs L39 4UF. Tel: (0695) 72449.



Ed Jones, winner Graham Hawke, Bruce Smith, Pete Wood and Tony Quinn at the presentation ceremony at the London Rock Shop

Sir is top of the pops

Graham Hawke has just walked out of the *Acorn User* offices a happy man – not surprising as he's the winner of the Great Music Competition in April's edition of Acorn User.

Graham won a Master 128, disc drive, colour monitor, UMI sequencer and Casio CZ101 keyboard synthesiser with his instrumental entry 'Space Love'. In addition to guitars and a drum machine, the sounds on Graham's tape were produced with a BBC micro, including a robot voice done with Superior's *Speech!*

Ultravox's Chris Cross, who was one of the judges, said: 'If Malcolm McLaren had recorded 'Space Love', it would be in the charts by now.'

Graham is head of maths at Wadebridge Comprehensive School in Cornwall, and runs a guitar club and the school pop group. Although the prize is his own, he feels that it may go the same way as the rest of his equipment. 'I always say I'll keep it at home,' he told us, 'but it always ends up in school.'

There was stiff competition for first prize, and copies of the Ultravox Collection album, signed by the band, are on their way to the 25 runners-up.

Mud bogged down by speed hitch

Mud still has a sticky problem with speed. The multi-user dungeon adventure game run by Muse is being consistently criticised for the slow response from its DEC Vax mainframe.

'The speed has vastly improved,' says Muse's Simon Dally, 'but it still has a long way to go. Sometimes there are 20 players and it runs fast and then there are three and it is terribly slow.'

It seems the hitch may be in the garbage collection routines in the Pascal code, and Muse has called in DEC engineers to look at the problem. But even when this hitch is solved, Muse will go on developing Mud.

Simon Dally said: 'I don't think that I or anyone else believes that Mud will ever be finished. It will carry on growing.'

The number of players has steadily grown, in spite of a slow response at the beginning. Those who do play tend to buy time credits in large quantities.

So far, seven players have made it to the top level of the game, achieving the status of Wizard.

POST A PROBLEM

AS a result of pressure from readers, *Acorn User* now guarantees a fast reply service for enquiries. Your answer will be returned within 10 working days for just £2 (includes VAT), or your money back.

The idea is simple. Just write out your problem, fill in the coupon (right), and send both off to *Acorn User* with a stamped addressed envelope and cheque or postal order for £2. (If you want recorded delivery, add the cost of this on. The same goes for overseas readers.) Include as much detail as possible and a disc or cassette if a program is involved – with enough space to record any corrected listing.

We will then answer the problem and return all material received – within a guaranteed *10 working days* from receipt. If we fail to match this promise your cheque or postal order will be returned with the answered question. If we cannot answer the problem, the cheque will be sent back to you.

If you want a listing debugged, advice on hardware or software, or a list of addresses, send us your problems.

ACORN USER READER SERVICE
141-143 Drury Lane, London WC2B 5TF

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Daytime phone number ....

I enclose a cheque/postal order for £2 and an sae with my problem.

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Date out:
Answered by:

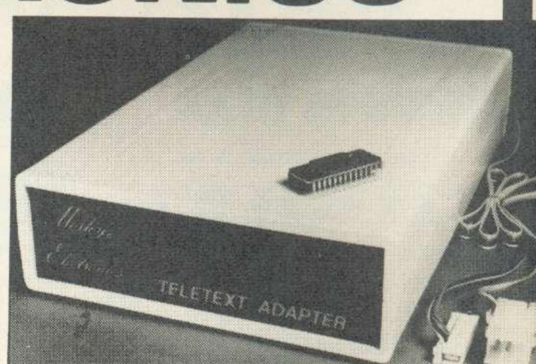
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The Morley Teletext adapter introduces you to the world of Teletext at a price that wont break the bank. Inside it you will find the latest in second generation Teletext chip technology, which unlike our rivals who are still using chips designed more than eight years ago, will be fully compatible with any future advances in the Teletext system.
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For technical details please ring Morley Electronics on Tyneside (091) 262 7507

FEATURES

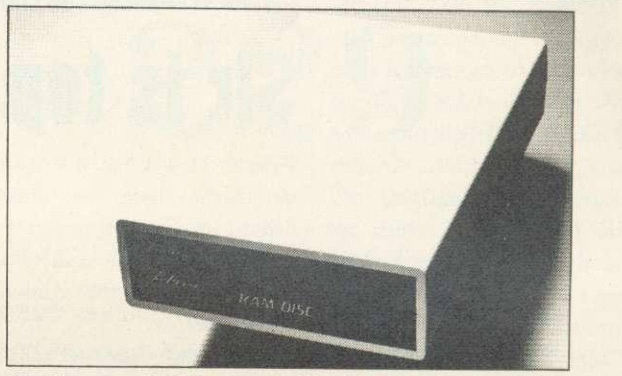
- Advanced design uses the latest technology will handle ANY future enhancements to the Teletext system eg: full field: 8 bit data transfer: 2k pages etc.
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- Free software upgrades to allow for any enhancements to the teletext service. Eg: extra channels, full field data on cable & satellite systems etc.
- Easy to follow comprehensive user guide.
- No hardware limitations, it can for example receive virtually unlimited numbers of channels.
- Works with Solidisc SWR.



- Utils disc available including printer drivers allows pages to be selected and dumped direct to a printer (no more TV or Radio Times to buy).

ELECTRON TELETEXT ADAPTER
Electron adapter now available, including emulated Mode 7 allowing you to run long Adventure type programs. Please ring for details.

Now available the first true MEGA capacity RAMdisc for the BBC or MASTER computers.
This fully compatible unit, currently available in either 1 or 2 megabyte versions comes complete with operating software on ROM, power supply, battery backup and a comprehensive user guide, add to this our usual 12 months no quibble guarantee and we're sure you'll agree Morley have done it again.



FEATURES
1 Megabyte of RAM connected to the 1 MHz bus.
Used with the supplied ROM software programs and files may be saved and loaded from the RAMdisc in the same manner as from a floppy disc with a large increase in speed, for example, a 20K mode 0 screen takes about 3-4 seconds to load from disc and about 0.2-0.3 seconds to load from the RAMdisc.
The RAMdisc ROM operates as a utility ROM working with the current filing system rather than as a separate filing system. Therefore ensures compatibility with any DFS.
The RAMdisc can be selected by a * command to take the place of any drive number from 0 to 9. If the RAMdisc replaces a floppy drive as 0 for example, all commands addressed to drive 0 will be intercepted by the RAMdisc. The default drive no. is 4.
'Dangerous' * commands such as *COMPACT, *COPY, *BACKUP etc are intercepted and the BBC's RAM from page 2 to &7FFF is saved to RAMdisc workspace, and may be recovered using a * command. This prevents accidental corruption of any programs/data in RAM you may have been using at the time. The save operation delays the * command by just under 0.4 seconds. The BBC's RAM can also be saved by an interrupt-driven routine which can be enabled by a * command.
The 'filing system wedge' ROM supplied supports load/save, byte file access, all relevant OSFSC commands, and contains a formatter, verifier and 'sector' editor for use with the RAMdisc.
Catalogue structure allows up to 2,709 files.

APPLICATIONS
Programs and ROMs can be written to take advantage of directly accessing a single RAMdisc, allowing the possibility of spreadsheets with more than 512 × 512 cells, million-character documents with immediate access and editing of any section, manipulation of 2 floating-point arrays each with 228 × 228 elements, a fast-access database with 10,000 100-character records, or even just a large printer buffer!
Accessible through the user's software for direct storage of eg: basic procedures, variables, large arrays etc which can be downloaded into the BBC's RAM or read directly. (We are hoping to be able to supply an extended basic ROM late this year, to allow 'transparent access' to the Ramdisc, which will effectively expand the BBC's RAM to about 1020k.)

OPTIONAL SIDEWAYS RAM UTILITY (suitable for use with any 16k SWR)
Sideways ROM images can be saved to the RAMdisc under a special directory which, when enabled, will be used when an unrecognised * command is trapped for the ROM to load sideways ROMs from disc into sideways RAM. The * command will then be passed to the new ROM image and if still unrecognised the next ROM will be loaded. If no ROM loaded from the RAMdisc intercepts the * command it will be passed to the current filing system as usual. ROMs on RAMdisc can be individually disabled in the same manner as 'real' ROMs in the BBC itself. Up to 104 8k ROMs can be saved onto the standard 1Mb RAMdisc, and the total load time (excluding time taken by the ROMs to process the command) for 100 ROMs is just under 9 seconds. All relevant control software for disabling/enabling ROMs etc. is provided. (Supplied on ROM.)

EPROM PROGRAMMER now available programs 8, 16 and 32k EPROMS connects to the user port software available on rom or disc.
Version 1 economy uncased with standard DIL socket.
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DESFAX 7 – Now you can run your own TELETEXT service! Incorporates the powerful editing facilities of DESIGN 7, again with Teletext adapter interfacing.
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M/B software DESIGN 7
Easily the best value Mode 7 screen designer on the market today. Design any mode 7 screen, from simple MENU pages to full CEEFAX standard. This program is an invaluable aid. Designs can be saved to disc as automatically numbered files or the program will convert the screen into a Basic Proc.
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NOW AT NEW PREMISES

Please send me.

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- Qty. ☐ 2 Mbyte RAMdisc @ £349.95 inc. VAT & P&P.
- Qty. ☐ Utils ROM @ £18.95 inc. VAT & P&P.
- Qty. ☐ Eprom Programmer V.1 @ £18.95 inc. VAT & P&P.
- Qty. ☐ Eprom Programmer V.2 @ £27.95 inc. VAT & P&P.
- Qty. ☐ Desfax @ £24.00 inc. VAT & P&P.

NB. ROM or Sideways RAM software must be purchased with Teletext Adapters.

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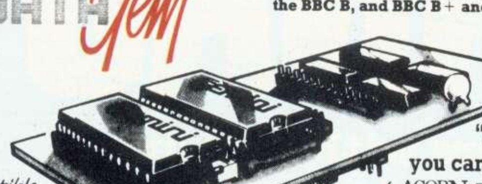
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Gemini — CONNOISSEUR ROMS

The Definitive Random Access, 24K ROM based Database Management System for the BBC B, and BBC B+ and BBC Master

DATAGem



Now compatible with most double density DFS's

"Excellent if you can afford it..." (ACORN USER Dec. '84)

Now You Can!

~~£129.95~~ **£79.95**

DATAGEM

Long hailed as the most comprehensive and powerful database for the BBC, and now becoming a legend in its own right, DataGem has been significantly reduced in price now that development costs have been recovered by Gemini. Whether you have a single 40 track drive or a Winchester hard disk, this system will make use of ALL your disk space, treating up to 4 drive surfaces as ONE CONTINUOUS FILE. Much has been made and exploited of DataGem's superb selective searching capability, and together with its unmatched mathematical powers, the system provides a really professional database for use in the home, office or school that will harness the full power and potential of the BBC micro.

AMATEURS & PROFESSIONALS

For newcomers to databases as well as seasoned users, DataGem represents an ideal starting point. Structuring your file and layout couldn't be simpler using DataGem's on-screen 'painting' format. You can have up to 62 fields or data items wherever you want them on a scrolling 120 x 120 card. Colours are all definable, and field data and field titles may be separated if required. Data entered may be stored in up to 8 tiers or 'levels', as well as within the whole database file. Scan one level or the whole database for records that match your search parameters, and place them in another data level for later manipulation. DataGem also boasts limited facilities for producing data merged letters, and may be configured as a 62 cell spreadsheet.

TECHNICALLY SPEAKING

The System Comprises:-

1. 2 EPROMs mounted on carrier board containing 24K of 6502 optimised machine language. Carrier board may be inserted in either of two positions under keyboard or in sideways ROM board.
2. Demonstration applications disk in both 80 and 40 track format with documented examples of DataGem files. Disk contains no DataGem program code.
3. Full colour packaging consisting of A5 ring binder with professional documentation, user registration card and quick reference card.
4. Utility program named 'Trans' also supplied to allow transference of data files from all other Gemini databases.

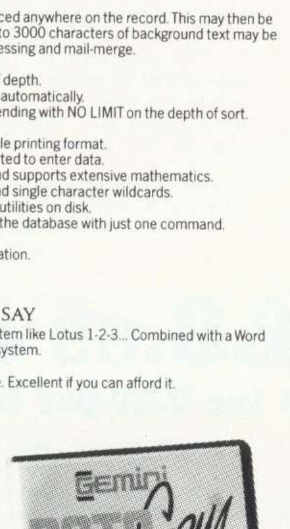
The System Features:-

- Permits just ONE file to exist over FOUR floppy disk drive surfaces with a maximum file size of at least 10 Megabytes.
- Allows up to 5100 User Definable Records.
- Maximum number of 62 fields per record, which may be any combination of the following types:-
  STRING – Up to 120 characters long
  DATE – Either two or four digit year dates may be selected.
  TEXT – A field with no data, allowing background text to be placed anywhere on the record. This may then be altered/moved/deleted, even after the database is in use. Up to 3000 characters of background text may be placed on the record in this way, enough for limited word processing and mail-merge.
  NUMERIC
- Allows searches on any field or COMBINATION of fields to ANY depth.
- Up to 9 subsets of data INSTANTLY available and saved to disk automatically.
- Sorts alphabetical or numeric on any field, ascending or descending with NO LIMIT on the depth of sort.
- Interfaces with 'VIEW' and 'WORDWISE'.
- Includes a free format report generator for a completely flexible printing format.
- Allows the user to extend the file or add fields after having started to enter data.
- Offers a free format painted screen which scrolls 120 x 120, and supports extensive mathematics.
- Provides User defined field relational variables and multiple and single character wildcards.
- Exists self contained on ROM, and does not require additional utilities on disk.
- Finds the occurrence of a string or partial string in ANY field in the database with just one command.
- Mathematical Operators
  +, −, ★, /, multilevel parentheses (up to 50 levels), unary negation.
- Logical Operators
  >, <, >=, <=, <>, =, ★(AND), +(OR).

WHAT OTHERS SAY

DataGem provides many of the Spreadsheet facilities of an item like Lotus 1-2-3... Combined with a Word Processor, it forms the basis of a very competent small business system.
Personal Computer News – July 1984.

DataGem stands out in terms of both price and performance. Excellent if you can afford it.
Acorn User – December 1984.



STOP PRESS!!!
BBC MASTER VERSION
DataGem is now available in cartridge form, ready to plug straight into your BBC Master. It has been especially re-written for the Master and ADFS disk controller (including Solidisk ADFS).
£79.95
(or **£25** upgrade/exchange)

MONEY-BACK GUARANTEE

The power and facilities of DataGem are just too great to detail in this advertisement. As the product is protected against unauthorised copying, we are able to offer our no-quibble money-back guarantee to customers purchasing DataGem direct from Gemini. If you don't agree that it's worth the price, send it back to us undamaged within 7 days of purchase for ANY reason and we'll refund your money – immediately.

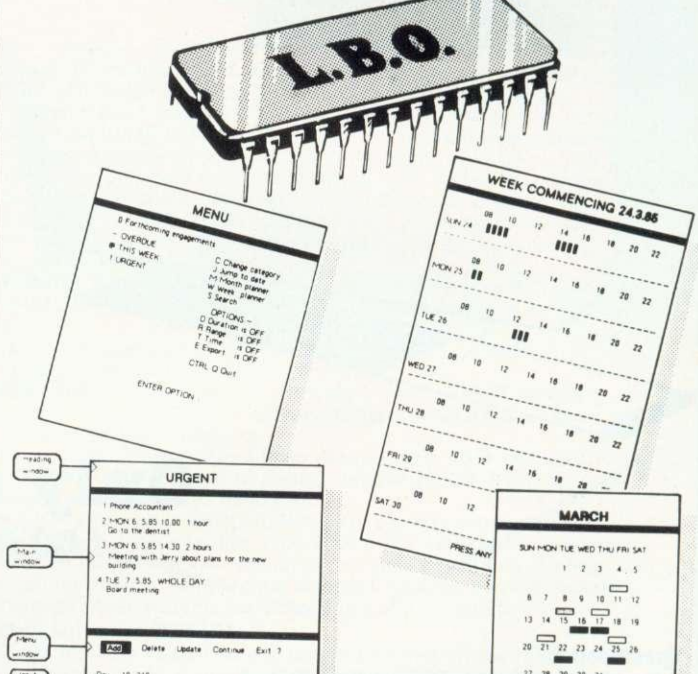
L.B.O. LIFE & BUSINESS ORGANISER

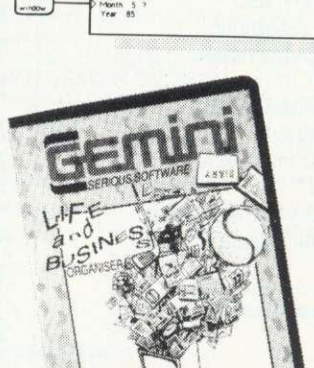
Question: How do you create a diary computer program that people will actually use?
Answer: Take careful note of the following:

1. A diary program will obviously be used on a regular basis and therefore must very simple and logical to use. ('LBO' was written in conjunction with a university lecturer in Cognitive Psychology)
2. A diary program must be expertly written to ensure ease of use, speed and flexibility.
('LBO' as written by 2 graduates in Computer Science from Exeter University)
3. A diary program must have printing routines to provide a portable record of events.
('LBO' has full printing routines, as shown)
4. A diary should offer searching to find an appointment.
('LBO' includes powerful searching facilities to find ANY appointment ANYWHERE)
5. A diary should remind the user of forthcoming events.
(Urgent and overdue notice boards show clearly any forthcoming or overdue events)
7. A diary must be tried and tested to confirm that all of the above criteria are satisfied. (Since 'LBO' was launched, Gemini's Managing Director has successfully been using the program to organise his busy life!)

Life and Business Organiser is the ultimate utility for the busy computer user in the home or office. It will put an end to forgetfulness and ensure that your time is organised, you know what you have to do and when, you don't forget bills or birthdays, and you are reminded constantly of urgent matters. 'LBO' will organise your life from today until the year 2000!

– the ULTIMATE BBC utility!





L.B.O. only **£19.95**

Also available on DISK for those with a cluttered ROM board – £19.95.
QL version also available now, MS-DOS version early 1986.

Gemini — BUSINESS DISK

INTEGRATED ACCOUNTING SUITE

INTRODUCTION

Designed for the small to medium sized business user, where speed and efficiency are vital, Gemini Integrated programs are suitable for sole traders, partnerships, or limited companies. All require a BBC B 32K microcomputer, and an 80 column printer. A double disk drive with an Acorn compatible DFS is required for integrated accounting purposes. A single disk drive may be sufficient where modules are used independently, although this is not recommended for the Sales Ledger and Invoicing module. The manuals indicate the system capacities for various disk drive combinations.

The programs have been devised by HCCS Ltd in the light of substantial mainframe computing experience, and share many of the features normally found only in very large installations. Used in a typical business environment where invoicing, sales ledger posting, stock control adjustment and nominal ledger posting are simultaneously made, the software will convert the BBC micro into a business computer of enormous power, directly comparable with hardware/software combinations costing many times its price.

Each program is supported by a comprehensive, easily followed manual, and 'user friendly' screen prompts with error trapping routines, which make a specialised knowledge of accountancy unnecessary for the average user. All the programs, however, have many sophisticated features which make the programs revolutionary for the home micro market.

Gemini Marketing Limited confidently recommend the programs to serious commercial owners of the BBC B micro as software capable of making an enormous contribution to business efficiency and profitability at minimal cost, since it requires no expensive second processor in order to achieve the advantages of integrated accounting.

INDEPENDENT PRESS COMMENTS

John Vogler reporting in December 1984 edition of 'A & B Computing' said of Gemini Integrated Accounting when comparing to Peartree, Micro Aid, Software for All, Acornsoft Mirle and Sage:-

"This is the newest and most exciting. To have achieved a substantial degree of integration, very rapid file access and respectably large file sizes, without the use of a second processor, is a fine achievement. As one would expect from GEMINI, the individual modules are eminently professional and for the first time present the single processor BBC as a viable small business computer ... GEMINI have produced a superb product ... superb examples of the programmer's art."

INVOICING & SALES LEDGER

The Gemini Sales Ledger and Invoicing program will produce invoices and statements for customers and enable a tight control over credit procedures to be maintained by producing aged debtors reports, and by keeping current information concerning customer accounts.

The module can be used independently or interfaced with the Gemini Nominal Ledger and Stock Control modules, and offers the following advantages: • Maintains open-item sales ledger. • Comprehensive customer Master File maintained in memory. • Choice of fixed and free format invoices. • Integrates with Gemini Nominal Ledger and Stock Control modules. • Prints invoices, invoice copies, statements and credit notes. • Reports include: Aged Debtors, Sales Daybook Sales analysis by user defined code, VAT analysis, Audit trail giving copy details of all transactions. • Automatic updating of sales ledger. • Comprehensive accounting controls including period end close down routines and full audit trail for all transactions. • Examine customer status by file enquiry to screen or printer showing year to date activity. • Trade and settlement discount terms definable for each customer. • Caters for up to 5 rates of VAT. • Can hold up to 135 customers on 40 track disk system and up to 610 customers on a 80 track disc per Sales Ledger file. • Comprehensive analysis of invoices over unlimited, user definable sales codes. **Price £69.95.**

PURCHASE LEDGER

Used independently or interfaced with the Gemini Nominal Ledger, the program maintains a complete file for each supplier, records amounts outstanding at any time, helps to determine which invoices are payable, and payment dates for the claiming of discounts. Among this module's many features are the following: • Automatic posting of suppliers' invoices to Purchase Ledger. • Comprehensive analysis of invoices over unlimited, user definable expense headings. • Comprehensive accounting controls including period end close down routines with posting reports, and full audit trail facilities at appropriate stages of processing. • Full integration with Gemini Nominal Ledger module. • Purchase invoices and credit notes easily processed. • Supplier file held in memory, with full details of each supplier. • Maintains open item purchase Ledger. • Management of invoices due for payment within cash restraints. • Maximum number of suppliers on 40 track disk system of 135 and maximum of 610 suppliers on 80 track disk system per Purchase Ledger file. **Price £69.96**

NOMINAL LEDGER

This is the central module of the Integrated Accounting system and may also be used independently as a Cash Book or interfaced with the Sales and Purchase Ledgers and payroll programs. It includes the following main features: • 143 Nominal accounts all of which are user-definable. • Posting of transactions from Sales and Purchase Ledgers and Payroll modules. • Full Cash Book facilities. • Print out of full Trading and Profit and Loss Account and Balance Sheet together with notes to the accounts. • Full accounts may be produced for whatever period chosen by the user. • Comprehensive accounting controls including period end close down routines and complete audit trail for all transactions. • Journal feature for adjustments between accounts and correction of book-keeping errors. • Reports include: Account Master File showing complete code listing. Cash Book entry details. Journal printouts. Trial Balance. Trading and Profit and Loss Account with notes. Balance Sheet with notes. Audit Trail Enquiry for all accounts. • Account enquiry showing movements over the period under review including opening balance, period end adjustments and closing balance. • Account posting masks allow conversion of analysis codes set up in other modules into selected user-defined Nominal Ledger codes. **Price £69.95**

PAYROLL

This program provides a full range of controls over the different aspects of Payroll Accounting icluding tax and other deductions. It can be used independently, or interfaced with the Gemini Nominal Ledger, and offers the following facilities: • Employee file maintained in memory, containig: Name, address, sex, marital status, National Insurance Number and contribution type, date of birth, personnel number, department, date employment commenced, all applicable tax codes, whether week 1 or month 1 applicable, hourly or salaried, pay cycle, payment type (cash, cheque or direct transfer), PAYE reference number, previous name, bank details. • Supports weekly, fortnightly, four weekly or monthly employees. • Company master file containing: Name, address, bank account number and name, bank name and branch, PAYE reference. • Produces cash analysis of note and coinage to suit requirements. • Employee pay details include: Gross pay and tax paid to date both current and previous employer. National Insurance contribution for employer and employee. Five rates of overtime per employee. Up to 12 standard and 5 non-standard pay elements per employee. Basic pay. Hourly rate. • Reports include: Payroll reconciliation, Payslips, Coinage analysis, Cheque and bank giro list, Payroll masterfile, Departmental analysis. • Relevant data to complete Inland Revenue forms including: P11, P35, P45, P14/P60. • Maximum 98 employees on 40 track disk system and 198 employees on 80 track system per Payroll file. **Price £69.95**

STOCK CONTROL

A program providing full control over every aspect of stockholding operations which can be interfaced with the Gemini Sales Ledger and Invoicing program, this module includes the following features and routines: • Inventory master File holding details of part number, selling and cost price, sales and product code, current stock, location of stock, allocated items, re-order level, quantity on order, current period activity and supplier code. • Permits four types of transactions – sales, returns, receipts and adjustments. • Part enquiry routines for any stock item. • Reports include: Part catalogue, giving stock sales and cost values. Re-order report. Evaluation stocks list, giving stock sales and cost values. Dormant parts report. Delete parts report. Stock usage report. Stocktaking sheet. Stock audit report sorted into part sequence and transaction type and date. • Screen prompt when item falls below the minimum re-order level. • Directly interfaces with Sales Ledger to enable automatic generation of product details for invoice production and adjustment of stock records. • Maximum 980 part numbers on 40 track disk and 1980 on 80 track disk per stock file. **Price £69.96**

NEW LOW PRICE — Price **£69.95** Inc VAT + p&p per Module



Includes 1 year software support

PAYROLL (Stand Alone) £39.95

The 'Payroll' program was conceived in 1982, when the first BBC computer was being produced. It was decided that a program should be written which would run on the BBC B cassette machine with a printer, this being the minimum requirement to run a payroll and at an affordable price of £39.95. Naturally, Gemini have updated the system to take full advantage of the new versions of the BBC and the arrival of disk drives, without updating the price!

One of the many features of this package is a facility for the user to alter the tax and national insurance rates, which changes 3 times a year, himself.

The program uses all of the excellent facilities of the BBC such as colour displays, function keys, printer interface and fast processing. It also includes substantial 'error trapping' which virtually eliminates human error.

'Payroll' is fully 'menu-driven' avoiding the need to continually refer to the user manual. It is not protected thus enabling the user to make backup copies of the program and data for security.

Handling up to 50 employees, it displays Gross Pay, Net Pay and Overtime for Hourly, Weekly or Monthly paid employees. Payrolls are automatically analysed under departmental heads and the most frequently used PAYE forms, such as P4, P35 and P60, can be printed when required. It also maintains most PAYE and NHI data together with essential SSP Information. Typically the program would take about a morning to process a payroll of 40 employees and about 6 seconds to process one employee. An End of Year routine is included which prints all of the totals and then zeros these ready for the next fiscal year.

Over the last 4 years 'Payroll' has been used by many thousands of employers and is particularly popular in education, since this easy-to-use program has proved ideal to teach students the fundamental features of a payroll.

(For those of you with a technical mind, the program has been written in fully structured BASIC, thus allowing easy modification for individuals).

STATUTORY SICK PAY PACKAGE £39.95

This business package has been specifically developed to meet the new and complicated SSP requirements recently introduced with effect as from 6th April 1986. The program has been especially written with the consideration of existing Gemini 'Payroll' users, ensuring similarity in operation and ease of use, thus providing an ideal compliment.

'SSP' will maintain up to 250 Employee Master Records (full or part-time), 99 separate SSP Records for an individual employee and 2250 SSP Records per disk.

Facilities include automatic assessment of SSP payments for any period to a maximum of 31 days, control of linked periods of incapacity to work (PIW's), automatic cumulative control of both SSP monies and number of weeks paid during the current financial year and latest (single/linked), PIW. The program issues a warning to raise SSP Termination SSP1 (T) and SSP Exclusion SSP (E) forms, a history recording and audit trail.

Printouts of the following are available: full file, selective SSP for individuals, SSP payments details for a selected tax pay period (for input to a payroll system), cumulative SSP details to date for DHSS P35 returns.

The program has password security, comes with a preparation utility for start of financial year and is not protected, thus enabling the user to make backup copies of the program and data for security.

DISK-BASED MAILIST £24.95

This powerful mailist program will hold up to 2000 names, addresses and telephone numbers. It provides many useful searching, sorting and printing facilities, even up to 3 labels across one sheet of paper.

'Mailist' uses Gemini's exclusive 'Searchkey' system, giving you the option of creating your own dedicated coding system for each name. For example, you could find all of the people who are eligible for a Christmas card this year!

This menu driven, simple and powerful program is ideal for business or home use.

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Gemini — Serious Software

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SOLIDISK SUMMER SPECIAL OFFERS

£40.00 Cash Allowance for your old ROM Expansion Board when you trade in for the Fourmeg 256K

or £10.00 reduction if you already have Solidisk DFS

The memory limit on the BBC Micro can now definitely be a thing of the past. The new Solidisk Fourmeg 256 board offers all you could wish for.
It has 256K of extra RAM, a superfast 4MHz CMOS processor, sophisticated memory management, sockets for high capacity ROMs and 48K of software in ROM.
In fact, it contains even more devices than the BBC itself. It is compatible with most hardware add-ons — except Sideways ROM expansion, which explains why this special offer.
Fitting it is easy. You remove the existing processor from its socket and plug the new board in its place, push on three colour-coded wires, clip on two mini-hooks and it's ready.
Switch on the computer and you will immediately see the difference.
The message "Solidisk 256K expansion (4MHz)" announces the new memory size and speed.
A switch at the back lets you select between the old (2MHz) and the new (4MHz) speed.
The BBC Micro at 4MHz easily surpasses the new MASTER 128K on benchmarks.
For example, it runs the benchmark using Basic 4 in only half the time taken on the MASTER 128K.
If you have too many ROMs to plug in at once, the Fourmeg 256 offers TWO ways out. First, it includes additional high capacity (and fast) ROM sockets. Moreover, two or four normal ROM images can be stored in one high capacity ROM chip (by "Vertical Paging") — so more can be made immediately available at your fingertips.
Secondly, ROM images can be stored on discs and loaded into any one of the eight Sideways RAM banks available.
If you need more room in "languages" such as VIEW or BASIC, you may use any of the eight SHADOW RAM banks.
No user memory is then lost to the screen, whatever the screen mode (while machine coded programs can access RAM right up to &FC00!).
Two frequent uses of the extra memory are as a RAMDISK or a printer buffer.
Star commands in the ROM can turn the extra RAM into a silicon DISK of 200K, compatible with both the Solidisk DFS and ADFS formats. The RAMDISK is at least 10 times faster than physical disc drives as it has no moving parts.
The printer buffer saves you time, it lets you use the computer while feeding your printer in the background.
In addition, the MANAGER ROM offers over 30 star command utilities to save time and effort using the computer.
To complement such a powerful product, Solidisk has arranged with Computer Concepts to bundle the famous WORDWISE PLUS wordprocessor ROM and manuals. This excellent product, worth £45.00 on its own, became the best selling wordprocessor for the BBC computer last year.
All in all, the Solidisk Fourmeg 256 offers an unmatched combination of speed, power and built-in facilities, while still having room for even further expansion. It is the most logical next step for the owners of any Sideways ROM board or of Solidisk Sideways RAM, who can trade in their present boards for the excellent Fourmeg 256.

Yes! I want to take you up on your special summer offer

"I will pay only: (delete if not applicable)

- [√] £135.00 instead of the normal price (175), I will send you my old ROM board when I have been satisfied with your Fourmeg 256.
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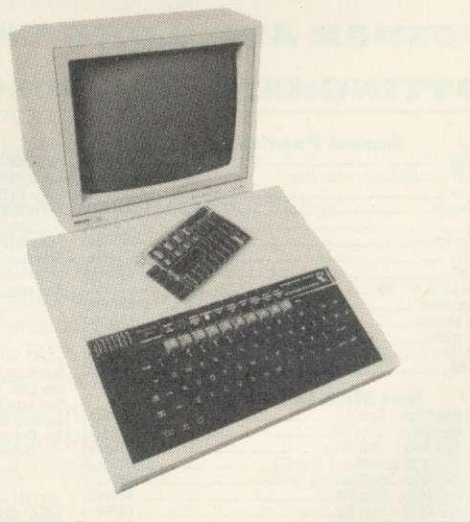
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InterWord's show debut

Computer Concepts will be selling its new WYSIWYG wordprocessor, *InterWord* at the Acorn User Exhibition – the first time that the product has been properly available at a show.

InterWord gives a choice of on-screen modes, including an 80-column and a special 106-column display. Many of the options, such as text formatting and printer control, are held on pull-down menus. And the processor incorporates many features not found on low-cost wordprocessors – such as page breaks indicated in the edit mode.

The ROM works with all versions of the Beeb and is compatible with shadow RAM, which helps to increase the amount of text you can edit. It is *not* compatible with second processors.

In addition, the company will also be demonstrating the companion database, *InterBase*, which completes the new family of business programs. The other two titles in the family are InterSheet and InterChart. Data can be passed between the programs using a dedicated ROM.

Finally, Computer Concepts is to demonstrate a fast, chip-based spelling checker. This is based on a 128k ROM and will allow checks to be made from within the wordprocessor. As well as identifying suspect words it will also suggest alternatives. Unfortunately, a shortage of 128k chips means that it isn't yet ready for sale.

Acorn launches two for business

Acorn is to unveil the Master 512 at the Acorn User show, alongside the M19 – its badged version of ths Olivetti PC-compatible. This represents a determined double thrust by Acorn into the 16-bit business computing market.

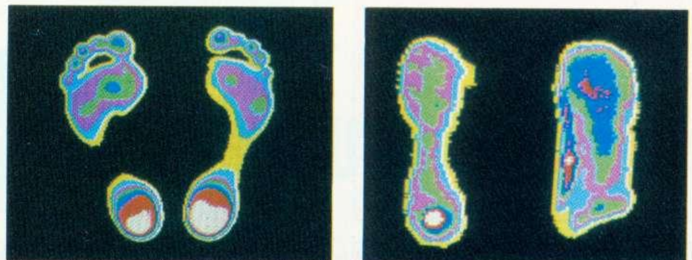
The M512 uses a 80186 co-processor which will support MS-DOS – the most common operating system in the business world – and C/PM-86. The operating system supplied with the machine is DOS+ which is compatible with both. The micro comes complete with the Gem front end, using the familiar windows and icons, and bundled software such as *GemWrite* and *GemPaint*. A mouse is provided.

One of the biggest questions when the M512 was first announced, was whether it would be IBM PC compatible. In fact, the new micro can emulate the IBM to a large degree, but some of the most important PC software, such as *Lotus 123*, still won't run as it accesses IBM hardware. When it does run PC software, however, the Acorn does it faster than the IBM, even though it is slowed by the screen mapping.

Nevertheless, the lack of total compatibility may make it a non-runner for some. To compensate, Acorn is selling its own version of Olivetti's M19 – an IBM clone which is fully PC compatible.

The M19 comes as a complete system – processor, keyboard, disc drives and monitor, unlike the M512 which is being sold as a separate computer or as an upgrade for Master 128s.

Best foot forward



The feet of a healthy person (left) differ from those of someone who is ill (right)

A BBC micro could come to the aid of people who find they can never put a foot right, thanks to an image processing system by Wild Vision, which will be demonstrated at the show.

The system is at the heart of a medical system designed to analyse the pressure points on the soles of the feet. This can reveal a lot about the way you stand, and help diagnose a wide range of ailments. The part of the system you stand on, the Pedobaroscope, is manufactured by John Drew Ltd. It employs a sheet of deformable plastic through which light is passed.

When you stand on the sheet it bends according to the pressure put on it, deflecting light by various amounts. A video camera is then used to record the image.

An increasing number of users want more than a straight image and so are using the Hawk V8 image processing system produced by Wild Vision to process the patterns created.

This can calculate foot area, highlight pressure patterns and store images on disc or paper.

Micronet's 'shadey' game

Micronet 800 hopes to preview a new on-line multi-user game at the Acorn User show.

Called Shades, the adventure can be played by anyone with access to Micronet, and should be available by late August. There is no registration fee (but there is a time charge of 99p per hour).

Mike Brown, Micronet's Technical Director, has produced software to convert the scrolling text from the host computer into standard viewdata format.

Apart from Shades, Micronet will be selling the Modem 2000 bundled with one quarter's subscription, and software, normally available by mail order, at a 25 per cent discount. On the news pages of the database will be up to the minute reports on the show.

4th OFFICIAL ACORNUSER Exhibition

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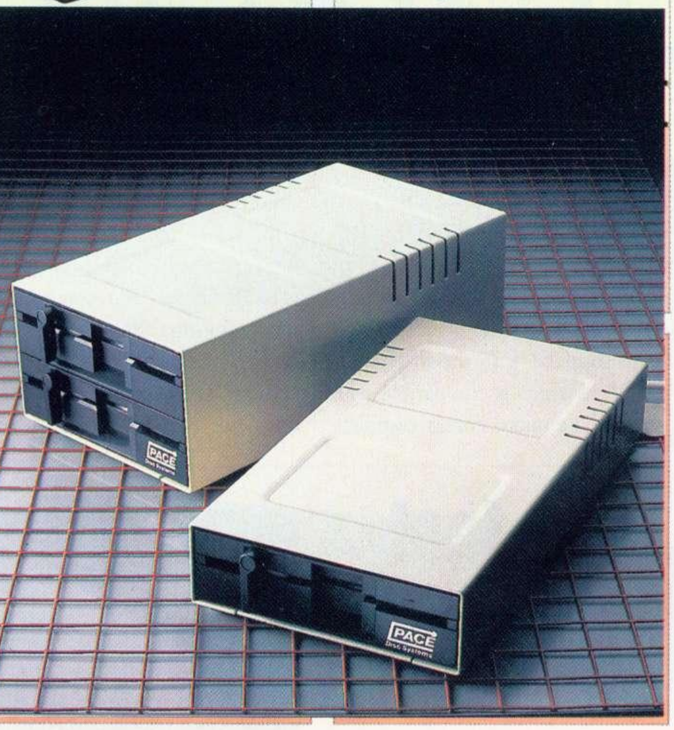
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PMS second processor at under £100

Second processors for under £100 are the main attraction on the Permanent Memory Systems (PMS) stand.

The company has already released a 6502 second processor for the Electron at £89 and it will be launching a similar product for the BBC micro at £99. And it has recently tied up a deal with Acorn which allows it to bundle Hi-Basic with the processors.

The Electron device plugs into a Plus 1 interface, giving a lot of extra memory and a 300 per cent increase in speed. No modifications are necessary to the machine. The operating software comes on disc, cassette or ROM. The Beeb version doesn't have the same dramatic speed increase, but the memory available for languages and applications is larger.

Both processors use legal routines, and so will work with all properly written software.

The other main product from PMS is a printer driver ROM – *Multi-Font NTQ* – giving high quality text in a wide range of sizes. In fact, the product comes as a basic set of two ROMs. One supplies the controlling program and a couple of fonts, the other chip is a font ROM, giving extra styles. More font ROMs can be added, and you can design fonts.

Pace unveils Master modem

Pace is to show its internal modem for the Master at the Acorn User Exhibition. Offering full auto-dialling and auto-answer, the modem slots into the computer in the space between the power supply and the main board. It connects to the computer using a special internal interface, leaving the RS423 free.

Pace has been working closely with Acorn on this product. It had been hoped that the modem would be on sale at the show, but problems with the Master's battery have slowed things up.

The new modem will come as a complete package with an updated version of Pace's communications software. The *Commstar II* ROM has several improvements over its ageing predecessor, and, as well as being bundled with the modem, will also be sold in its own right for Beeb owners.

Modem House is also working on an internal modem, but has had similar trouble with the battery. However, its new comms software, *Commsoft*, is creating a lot of interest among modem users.

The ROM is being bundled with the Voyager 7 modem at a price of £89.95. Separately they cost around £110. Modem House is also selling its introductory packages of hardware and software for less than £30. The company will be demonstrating its products by showing what you can do with cheap and free software downloaded by phone.

Database dialling

An autodialler for people is the featured product on the Wigmore stand. A telephone-dialling device attached to your Beeb is operated by special database software (see page 159). Type in a few letters of a person's name, and the database finds the number which you can then dial with a single keypress.

The company even has an add-on in the pipeline which can sense intruders and warn someone over the phone.

Elk budget games

Blue Ribbon is responding to pleas for Electron games by launching five or six new budget titles at the show. And a range of low price software is also being introduced. The £1.99 games include popular titles such as *Darts, Ravage* and *Diamond Mine 2*.

Blue Ribbon also has Electron compilation discs, containing five games, for just £9.95.

Come meet the Acorn User gang

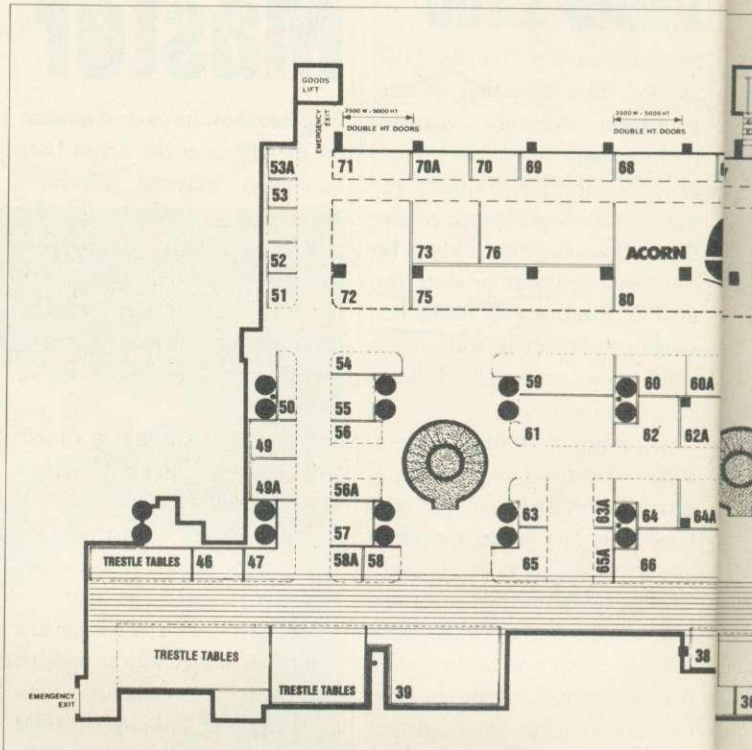
As usual, the *Acorn User* staff and our regular writers will be at the show to offer advice and sort out problems. Bruce Smith and David Acton will be around at various times to answer your technical problems. Tony Quinn, the editor, will be presiding over events.

People like Joe Telford, Nick Evans, Mike Barwise and other regular authors will be popping in to the show.

The show is your chance to catch up on back issues, take out a subscription and get hold of all those *Acorn User* goodies you see in the magazine. We'll have sideways RAM chips, barcode booklets and the usual games and utilities on disc and cassette. There are the monthly listings cassettes and discs too, which could save your fingers a lot of wear and tear. And there'll be bargains galore.

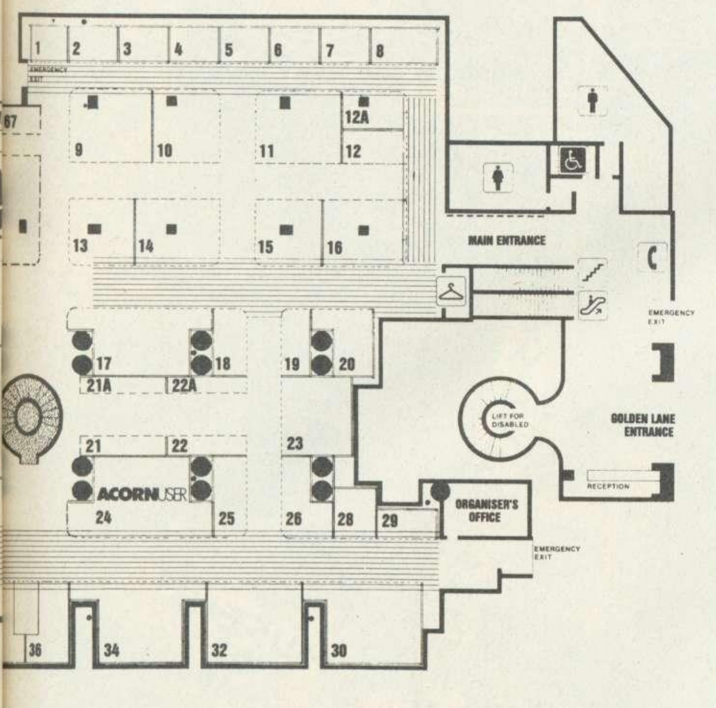
Make sure to pay us a visit, whether to tax our minds, buy some software or hardware, or just for a chat. *Acorn User* is on stand 24 – if you can't find the person you want there, try the bar!

Where you will f



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How to get

Thursday 24 July – 10am to 6pm
Friday 25 July – 10am to 8pm
Saturday 26 July – 10am to 6pm
Sunday 27 July – 10am to 4pm

Venue

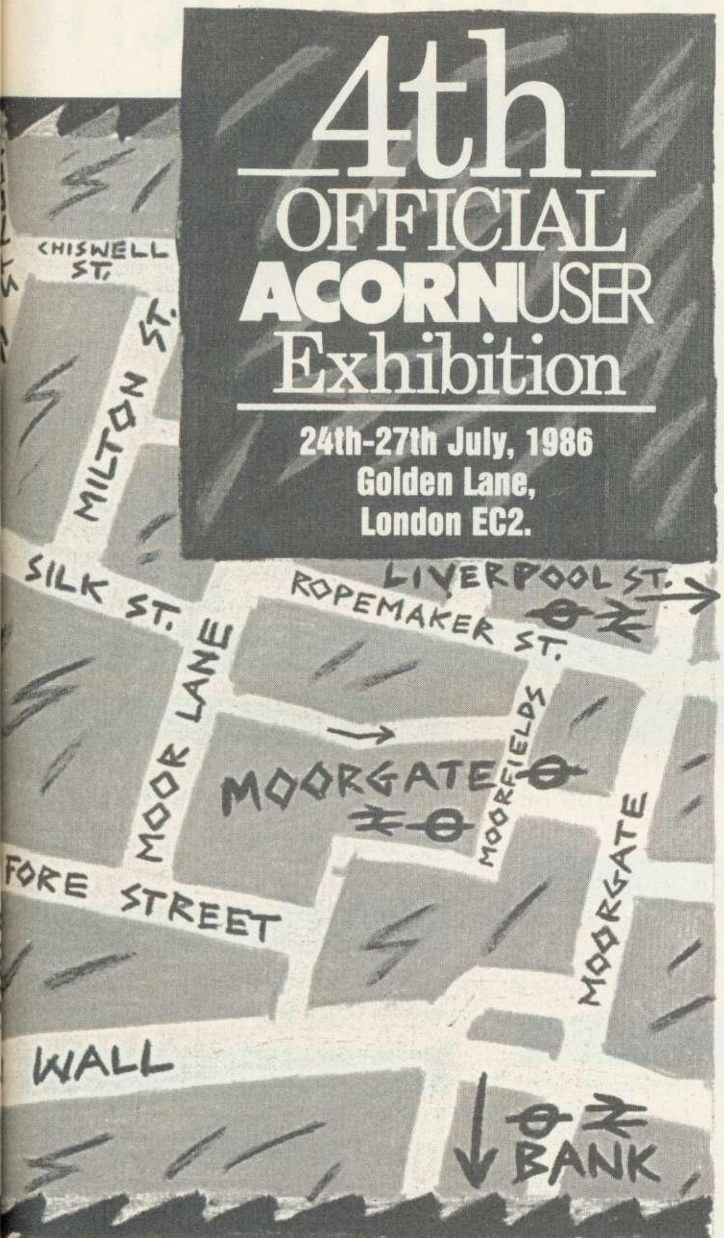
Barbican Exhibition Hall B.

The main entrance is in Golden Lane, which is off Beech Street. Note that the show is in the Barbican Exhibition Centre – *not* in the main part of the Barbican Centre. If you go to the wrong place it could be years before anyone sees you again.

There are two NCP car parks in Beech Street, practically next to the hall. That could prove handy when you stagger out carrying all that new hardware you've just bought. The car parks are on the same level as the hall, so people in wheelchairs should have no problems.

The nearest tube is the Barbican which is on the Circle and Metropolitan lines. Walk from there up Beech Street and you'll find Golden Lane on your left. Other tubes are Moorgate, St Pauls, Bank and Liverpool Street.

Nearest British Rail station is Moorgate, although Liverpool Street, Cannon Street, Broad Street and Holborn Viaduct are



there

within reasonable walking distance.

The nearest bus route is the No 4 which stops near the Barbican underground station.

Show going is hungry work. Full catering is provided upstairs, away from the manic crowd in the hall itself, along with a much-needed rest area. You can buy anything from cold snacks to hot meals. And for those who don't like to eat on an empty stomach, there is also a bar.

There are facilities for the disabled, including a lift. In the case of any special requirements or difficulties, enquiries should be directed to the show organisers – Editionscheme Ltd, HR House, 447 High Street, Finchley, London N12 0AF. Tel: 01-349 4667.

Hints and tips

Get there early. The place tends to get packed and special offers can sell out. So if you want to get close to the latest software and hardware it's best to beat the crowds.

Bring a bag for all those brochures and low-price goodies, or risk the curse of the bursting carrier. And wear comfortable shoes – you're going to be doing much more walking and standing than you think.

Go for great graphics

Graphics hardware and software is a strong feature of the show.

Making its first appearance at a show is an updated and improved version of the Grafpad graphics tablet with new, more sophisticated software on ROM and disc. AMS will be showing the new AMX mouse and *Pagemaker* products for the Master (see news).

Linear Graphics has the *Plotmate ROM*, which is designed to run the company's £299 A4 plotter – one of a new range being shown. The ROM also contains general graphics facilities.

From Solidisk come two new colour ROMs, giving up to 32 colours on screen. They give additional colours in 40- and 80-column modes and, by using their own RAM, leave all the computer's memory free for programs.

Wild Vision has a colour card allowing you to select up to 16 on screen from a palette of 4096 shades (see news).

Programs to control printer fonts are also popular. Minerva Systems is producing the *Printer's Angel* on disc for £27.95. And CJE Micros has the *Multi-Font NLQ* package.

More support for offices

Several new items of software and hardware are appearing for the business user at this year's show.

Minerva Systems is supporting its System Delta product with a range of applications. System Delta provides a framework for setting up data management systems by handling all the commonly used filing and sorting routines.

The system itself comes with a card index application. Now Minerva has produced several more applications, including video rental, school administration, accounting and hotelier programs.

Peartree Computers is launching two new wordprocessors with a difference – one is in Greek and the other in French, including all the relevant characters and accents. They also have a new school database and will be selling business hardware packages – for example, a Master bundled with a printer – at special prices.

Watford has produced a printer driver ROM for *View* users which saves you the trouble of setting up your own drivers and loading them from disc. The ROM supports all popular printers.

CJE micros has a sideways RAM-based information system, which can be called from any other program and also provides a printer buffer. And finally, Audiogenic is to introduce *Swift* – a new ROM-based spreadsheet.

Try out the new games

One of the major games launches is *Thrust* from Superior Software. This title rocketed up the Commodore charts and Superior believes the BBC micro version to be even better.

Tynesoft has several new releases for the Beeb and Electron, including the intriguingly titled *Vindaloo*! The others are *Drag Racing* and *Commonwealth Games*, plus one important new game that is being kept under wraps.

Tynesoft is also bringing out Master versions of all its bestsellers, including the chart-climbing *Winter Olympics*.



Winter Olympics: now for the Master

There's another action-packed game from Audiogenic, called *Psycastria*. And the company will also be selling a previously unreleased game – *Zorakk the Conqueror* – at a very low price.

Shards Software has come up with an adventure compilation of its four best titles – *Woodberry End*, *Galilea*, *Pettigrew's Diary* and *Java Star*. The package contains hint sheets. Price £14.95 on disc, £11.95 on cassette.

Beasty gets sensor pack

Commotion is increasing its range of robotics products with a sensor pack for the Beasty arm and interface, containing a range of devices, including proximity, light and heat sensors, plus an interface to plug into the Beeb's analogue port. The company will also have a new catalogue containing over 1000 products at the show.

The latest additions to the BBC Buggy will be displayed by Economatics – a grab arm and pen unit, which turn the buggy into a robot or turtle.

Economatics will also be showing two new computer-controlled models from Fischertechnik – a four-motor arm and a small plotter/scanner – as well as the standard robot kit and the Marconi tracker ball.

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£64.95

"System Delta is an exciting development in Database software for the BBC micro. It provides the kind of incentive to program your own applications which dBaseII did when it first appeared for the CP/M systems." (Personal Computer World)

"Money spent on System Delta could become one of the most cost effective investments ever laid out by enabling the BBC to handle previously impossible tasks." (Micro User)

ALL APPLICATIONS NEED THE SYSTEM DELTA ROM

'. . .a whole new world of specialisation looms on the horizon' — *Prestel*

'It's no longer on the horizon — look here and see our first release of applications!' — *Minerva Systems*

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"This database ranks with the best providing every facility ever likely to be needed. Most other software houses would be advertising it as the all singing all dancing database." (Micro User)

"Exceptionally simple. I have little doubt that the time taken to design the application will be less than virtually any other database I know. In short the person who finds this package's limits a problem should not be using the BBC micro." (Micro User)

"Anyone looking for a good, easy to use database should look hard at Minerva's Card Index Appliction as it is a fast and versatile program in its own right. Many people will buy System Delta for the Card Index alone." (Personal Computer World)

"I must unreservedly recommend this product." (Micro User)

"The great innovation with Delta is its flexibility unlike dedicated databases it allows practically unlimited scope for modification." (Prestel)

This Database is supplied FREE when purchasing System Delta.

REFERENCE GUIDE



To take full advantage of System Delta this Reference Guide contains full details of all commands, example usage, technical points as well as the overall concepts of the system. Fully explained Job Costing example.

"Although the manual is highly detailed because of the nature of Delta it is quite precise and very straight forward." (Prestel)

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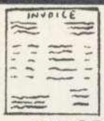
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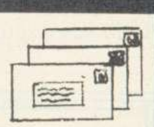


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THIS IS NOT A SYSTEM DELTA APPLICATION

£27.95

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£19.95

PLEASE RUSH ME BY RETURN/SEND FURTHER DETAILS

System Delta with FREE Card Index ☐ Ref. Guide ☐
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Hotelier ☐ School Admin. ☐ Order/Invoice ☐
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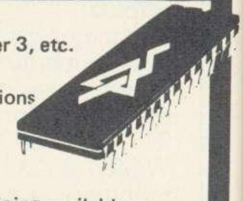
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All aboard for plug-ins

Acorn users seem to like plugging bits into their computers, and there are plenty of new bits to plug in. Solidisk has a real-time clock board which gives the time continuously at the top of the screen, it also allows you to configure the machine in a similar way to the Master.

Also from Solidisk come the Fourmeg boards. These replace the existing CPU, giving much faster processing speeds. The Fourmeg 256 comes with 256k of RAM which can be configured as a RAM disc, shadow memory, printer buffer and ROM pages.

A 32k version will make its appearance at the show, and Solidisk is offering trade-in discounts off both boards if you bring in your old ROM board.

Care Electronics is launching cartridges for the Master. The standard cartridges have a similar specification to Acorn's product, although they should be cheaper and more readily available.

In addition, Care has an extender card allowing its Beeb cartridges, and those made by Viglen, to be used on the Master.

Chalice will be showing a new sideways RAM device for the Beeb, and an EPROM programmer. And from Watford Electronics there is the Eureka card which gives you 58k of memory to use in *View*, *Wordwise* and Basic.

Hard disc drive prices plummet

Hard disc drive prices are coming down and several companies will be showing new or existing Winchester units at the show.

Akhter is already well established in the world of floppy disc drives. Now the company is bringing out a range of low-cost Winchester disc drives in a range of capacities.

Some of the Winchesters come combined with floppy disc drives or tape streamers to make backing up files easy. Prices start at around the £760 mark.

Solidisk and Viglen will also be showing their hard disc units. These are stand-alone drives, in contrast to the Acorn products which are sold as Econet file server devices. Solidisk's prices start at around £500 for 10Mb and Viglen's at £760 for 20Mb.



The Opus Challenger 3

Watford Electronics will be demonstrating, though not selling, a new 20Mb Winchester. However, the company will be selling its range of floppy disc drives, many at bargain prices.

Several companies will be selling floppy discs, library cases and storage boxes at the show. These will include Disking, Reflex and Direct Disk Supplies.

Finally, you will have the chance to cast your eye over the Challenger from Opus. This is a combination of a single, double sided 80-track disc drive plus a very fast RAM disc. The unit, which has a built-in double-density disc interface, now comes in 256k and 512k RAM disc options for £200 and £250 respectively. Opus will be doing special deals on standard drives bundled with a double density interface.

Treats for the Electron

Electron users are in for a treat, following the resurgence of interest in the machine.

Slogger is one company which is supporting the Electron, and there will be two new products at the show. The first is the Rombox II which effectively replaces the now-defunct Plus 1. It offers two cartridge sockets, four ROM sockets and a printer interface for a price hoped to be around £45.

The other Slogger product is a shadow RAM board for the Elk, freeing the normal RAM for programs and data. This will be seen for the first time at the show.

Advanced Computer Products (ACP) will be showing its sophisticated Electron interfaces alongside its BBC micro products.

The Plus 5 is perhaps the most exciting new device, as it gives Electron users access to Acorn second processors. In addition there is a version of the new Advanced 1770 DFS for the Elk (as well as the Beeb and Master).

The Advanced Electron DFS E00 is a device for users of the company's sideways RAM product, and allows a disc interface to be used without raising the value of PAGE.

News in brief

- As well as selling blank discs at low prices, Once Byten will be demonstrating the Polaroid Palette system. This device allows you to obtain colour photographs from a computer to use in audio-visual displays.
- Slogger is launching a charity appeal at the show. Using the company logo of a rampant Tiger as its starting point, the company has had a number of toy tigers made and will be selling them at the show, with all proceeds going to cancer research. No price has been fixed, but expect to pay around £15.

TECHNOMATIC

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305 Edgware Road, London W2 Tel: 01-723 0233

LEADING SUPPLIER TO THE BBC MARKET ESTABLISHED OVER 15 YEARS

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512 Upgrade	(Expected to be in stock by July)	£347 (a)
ADF13	Rom Cartridge	£13 (d)
ADF10	Econet Module	£43 (c)
ADJ22	Ref. Manual Part I	£14.95 (c)
ADJ23	Ref. Manual Part II	£14.95 (c)
ADJ24	Advanced Ref. Manual	£19.50 (c)
	View 3.0 User Guide	£10 (d)
	Viewsheet User Guide	£10 (d)

UPGRADE KITS

1.2 OS ROM.................£7.50 (d)
DNFS ROM.................£17.50 (d)
Econet Kit.......................£55 (d)
1770 DFS Upgrade for Model B.......................£43.50 (d)
ADFS ROM (for B with 1770 DFS & B plus)...................£26 (d)
64K Upgrade Kit for B plus £35 (d)

ECONET ACCESSORIES

Econet Starter Kit.............£85 (b)
Econet Socket Set.............£34 (c)
File Server Level I.............£75 (d)
File Server Level II...........£210 (d)
Econet Bridge.................£174 (b)
Printer Server Rom...........£41 (d)
10 Station Lead set............£26 (c)
Adv. Econet User Guide.....£10 (d)

ACORN 32016 CO-PROCESSOR

Acorn Cambridge Co-processor combines with the BBC micro to provide full 32 bit processing. The National Semiconductor 32016 processor performs all language and application processing, the NS32081 floating point processor maximises the performance and provides support for IEEE standard fp handling.

The specially developed operating system PANOS, provides efficient interfacing between the languages and the hardware and software of the BBC micro incl. the variety of ACORN filing systems: DFS, ADFS and NFS. PANOS provides a variety of utilities including a full screen editor and a linker providing acces to both library routines and cross language linking.

FORTRAN 77, PASCAL and C languages with mainframe type implementations, fully compiled and provided with appropriate library support are included. Other languages include, Cambridge LISP with its compiler, a 32016 assembler and a 32bit interpreted implementation of BBC BASIC with full screen editor. 1 Mbyte of RAM is included as standard.

32016 CO PROCESSOR (Currently available from stock) £1130 (a)

Please phone or write for full specifications on the Cambridge Co-processor and Cambridge Workstation.

WINCHESTER DRIVES

Acorn Hard Discs are now available in 10 and 30 Mbyte versions. The drive plugs into the 1 MHz bus. The ADFS filing system with its hierarchical filing structure provides excellent file management facilities. Data transfer rate of 1Mbit/sec and average seek time of 85 ms provides the user very fast access to very large amounts of data. File Server Level III is installed as standard on Acorn Winchesters. The Technomatic Winchester Drive is supplied with the Acorn ADFS Rom and offers good value for money.

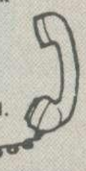
Acorn 10 Mbyte Winchester £1100 (a)
Acorn 30 Mbyte Winchester Drive £1630 (a)
Technomatic P20HD 20 Mbyte Hard Disc £659 (a)

TECHNOLINE

PHONE TECHNOLINE 01-450 9764 FOR DETAILED SPECS ON THE MASTER SERIES & UPGRADES

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Technical Information:
1200/75 Baud. Standard Viewdata/Prestel Protocols.
Please note that a 'Prestel' type terminal must be used.

Please phone for our latest Educational Price List.

EPROMs/RAMS

2764-25..........£2.00 (d) 27128-25..........£2.50 (d)
6264LP-15.........£3.40 (d)

ACORN 2nd PROCESSORS

Acorn Z80 2nd Processor: Z80 CPU with 64K of RAM housed in a separate case with a integral power supply interfaces with the BBC computer through the TUBE. It converts the BBC into a CP/M system and its comprehensive package of software provides a suitable basis to set up a business system. £329 (a)

Acorn 6502 2nd Processor: This processor provides faster data processing speeds and larger memory. Particularly useful for use with Hi View word processor for production of large documents. £162 (b)

MULTIFORM Z80 2nd PROCESSOR

This processor converts your BBC into a powerful CP/M system making it capable of operating in almost any CP/M format. Full details on page 4. £299 (b)

TORCH Z80 2nd PROCESSOR

ZEP100: This Z80 processor with 64K fits internally in the BBC computer and has the operating system in a ROM. It is supplied with the PERFECT suite of software comprising of a database, wordprocessor and a spreadsheet and a BBC BASIC for Z80. £229 (a)

TZDP240: ZEP100 with TECHNOMATIC PD800P dual drive with built in monitor stand. £469 (a)

ACORN TELETEXT ADAPTOR

This adaptor will convert the BBC computer into a teletext receiver capable of decoding and displaying the CEEFAX and ORACLE pages and the monitor screen. These pages can also be saved for later reference. BBC TV transmit educational software on their CEEFAX system which can be downloaded free of charge. £125 (b)

ACORN IEEE INTERFACE

This interface enables a BBC computer to control any scientific and technical equipment that conforms to the IEEE488 standard, at a lower price than other systems, but without sacrificing any aspect of the standard. The interface can link up to 14 IEEE compatible devices. Typical applications are in experimental work in academic and industrial laboratories, with the advantage of speed, accuracy and repeatability. The interface is mains powered and comes with cables, IEEEFS ROM, and user guide. £278 (a)

ROBOCOM BITSTICK

The renowned 'BITSTICK' graphic CAD package. Using the on-screen menu and colour pallette, it can draw freehand as well as lines and shapes with great accuracy. Any part of a drawing may be magnified many times, and up to 192 drawings may be saved on a disc. In total, a friendly yet sophisticated CAD system offering tremendous value.

ROBOCOM BITSTICK I £299 (a)

ROBOCOM BITSTICK II: This package is as Bitstick I with software upgraded to allow scaling and auto dimensioning. Multiplotter driver is also supplied with the package. £775 (d)

Upgrade for Bitstick I to II £415 (b)
Bitstick Multiplotter Driver (most popular plotters included) £69 (b)
Epson FX80 Screen dump routine for Bitstick I £35 (d)
Epson FX80 dump for Bitstick II £39 (d)

DISC DRIVES

All drives listed below are fully compatible with single and double density DFSs. The larger capacity referred to below is for the Acorn's ADFS system.



Your computer installation can look like this with our PD800P drive

This highly successful drive offers unique features:

New slimline Mitsubishi mechanisms with ultra low power consumption (only 8 watts per mechanism), front locking lever and capable of single or double density operation. Ultra fast track access times and head settling times.

Fully compatible with the DFS and ADFS filing systems on the new MASTER's range.

40/80 switchable with switches located on the front panel. A generously rated switch-mode power supply ensures reliability with minimum heat dissipation for long periods of operation.

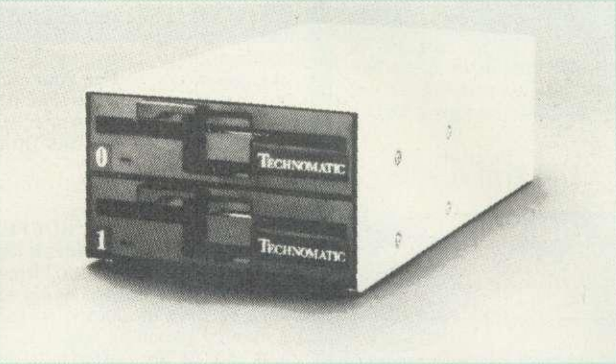
The mechanisms are set inside a sturdy monitor stand painted in 'BBC-matching' beige. Its 'looks' are enhanced by its black front panel, with attractive enamel-white markings.

These disc drives with a built-in monitor plinth provide a compact installation and give a professional look to the system.

As with all standard TECHNOMATIC drives it comes complete with a data cable, and a mains lead with a suitably fused 13A moulded plug.

PD800P 2 × 400K/2 × 640K 40/80T DS **£249 (a)**

PD800



TECHNOMATIC's stacked drives are housed in smart metal casings painted in BBC beige colour and are built to the same exacting standards as PD800P drives. The drives are fitted with integral switch mode power supply and supplied with a mains lead with a suitably fused 13A moulded plug and a data lead.

These drives are fitted with the new model MITSUBISHI mechanisms, which have been specially adapted for us to fit the 40/80 track switches on the front panel of the mechanisms. This would mean that the user no longer needs to grope at the rear of the drive to set the correct track setting.

PD800 (2 × 400K/2 × 640K 40/80T DS) **£229 (a)**
TD800 (as PD800 but without the psu) **£209 (a)**

SINGLE DRIVES

1 × 400K/1 × 640K 40/80T DS

TS400 £109 (b) **PS400** with psu **£129 (b)**

NEW Technomatic's hard disc drive with a 400K/640K floppy drive with integral power supply and built-in monitor stand. Provision has been made for the future installation of a tape streamer.

P204HP includes ADFS rom £865 (a)

3.5" DRIVES

These compact drives, used with most of the new 16 bit micros offer fast access times and high performance with minimum of power consumption. The mechanisms are 80 track double sided and are capable of both single and double density operation. The single drive is offered in a dual case with a blanking plate for future upgrading. The drives are supplied with all the necessary cables to make them ready for connection to a computer.

1 × 400K/1 × 640K 80T DS:	TS35 1	£109 (b)	PS35 1 with psu	£124 (b)
2 × 400K/1 × 640K 80T DS:	TD35 2	£199 (b);	PD35 2 with psu	£219 (b)

3M 5¼" FLOPPY DISCS

40 T SS DD	£11.00 (d)
40 T DS DD	£14.00 (d)
80 T SS DD	£16.50 (d)
80 T DS DD	£18.50 (d)

(£1 extra for library case packing)

FREE SWISS ARMY KNIFE for every three packs of discs.

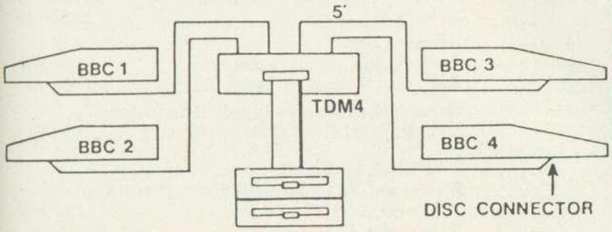
3M 3½" FLOPPY DISCS

80 T SS DD £18 (d) 40 T DS DD £25 (d)

Discs in packs of ten

DISC DRIVE MULTIPLEXER

The cost-effective alternative to networking! A self-contained unit that enables up to four computers to be connected to one single or dual disc drive. No hardware modifications — simply plugs into the computers disc interface connectors. No ROMs or other software needed. All DFS commands work as normal. The switching of drives between computers is totally automatic and completely invisible to the user. This unit is ideal for installing in classrooms and other situations, where networking is not planned or necessary, or where costs must be kept low. In many cases software needs to be shared, although full networking complexity and cost is not needed. Several of these units can be connected in series to allow more computers to access the same discs, i.e. two quads connected together will allow 7 computers to share 1 drive. Units are supplied with 5' of cable per outlet as standard. Mains powered.



TDM4 Quad Unit (up to 4 computers) **£135 (a)**
TDM2 Dual Unit (2 computers) **£75 (b)**

SPECIAL BULK DEAL

High quality **5.25"** with our usual lifetime warranty. The discs are packaged in a lockable plastic box.

50 Single Sided 40 track Double Density	£42.50 (b)
50 Double Sided 40 track Double Density	£55.00 (b)
50 Double Sided 80 track Double Density	£65.00 (b)

DISC STORAGE BOXES

NON LOCKABLE	**DB530** 30 × 5¼"	**£6.00 (c)**
LOCKABLE	**DB340** 40 × 3½"	**£8.50 (c)**
DB550 50 × 5¼" £9.50	**DB570** 70 × 5¼"	**£11.00 (c)**

DB5100 100 × 5¼" **£13.00 6b)**

DRIVEHEAD CLEANING KIT

The **FLOPPICLENE** drive head cleaning kit is an ideal way to ensure the optimum performance of your drives. The use of disposable cleaning discs eliminates the risk of contamination and abrasion of sensitive driveheads. These risks are normally inherent in the reusable drivehead cleaning kits. 5¼" **£14.50 (d)**
Floppiclene with 20 disposable cleaning kits. 3½" **£16.00 (d)**

TECHNOMATIC

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(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00

EPSON PRINTERS

LX80 £195 (a) **Tractor Feed £20 (c)**

FX85 £315 (a) **FX 105 £449 (a)**

A limited no of FX80s available at £260 each.

LQ Range: This range with 24 pin dot matrix printers offers a high, 200 cps, draft speed and superb correspondence quality print at 67 cps and truly high resolution graphics and a variety of fonts.

LQ800 £479 (a) **LQ1000 £729 (a)**

TAXAN PRINTERS

KP810 (80 col)....................£230 (a)
KP910 (156 col)..................£379 (a)

JUKI 5510 PRINTER

A new dot matrix printer from the reliable JUKI stable. Features include a fast 180 cps. NLQ at 40 cps. Full EPSON/IBM compatibility. 3K buffer as standard expandable to 15K. Full graphics capability and a variety of fonts including international characters set. **£229 (a)**

COLOUR PRINTERS

EPSON JX80 4 colour. **£420 (a)**
Integrex Colour Jet Printer. **£549 (a)**
Canon PJ1080A **£369 (a)**

BROTHER PRINTERS

NEW

A new range of dot matrix printers.

BROTHER M1409 £299 (a)
BROTHER M1509 £399 (a)

DAISY WHEEL PRINTERS

BROTHER HR15: * 14 cps * 3 K Buffer * Two colour printing * Proportional spacing * Underline * Bold * Shadow print * Super/Sub script + many other features.

BROTHER HR15 **£315 (a)**

JUKI 6100: * 15 cps * 2K Buffer * Switchable 10/12/15 cpi * Proportional printing * Linear Motor for maximum reliability.

JUKI 6100 **£249 (a)**

DOTPRINT PLUS

The most versatile NLQ rom for the BBC Micro. DOT PRINT PLUS not only gives you the 10 character pitch at 6 lines/in with underlined and double width characters as required but unlike all other NLQ roms, it offers a lot more.

* a built in CHARACTER FONT EDITOR enables disc users to create their own type faces for using in printing spooled text files.
* a built in View Printer Driver.
* MICROSPACING for professional justification in VIEW and — with discs — in WORDWISE/PLUS.
* true BOLD PRINT in addition to double width.
* 12 char pitch as standard — providing 96 CHARACTERS PER LINE on the FX/RX 80 for example.
* simple control codes allow VARIABLE PITCH LINE SPACING in 1/72" increments and VARIABLE PITCH from 12 cpi in increments of 1/240". (10 cpi can be selected by a single control code).

Suitable for use with printers fully compatible with EPSON quad density graphics.

DOTPRINT PLUS for FX/RX and compatibles. **£28 (d)**

DOTPRINT Dual for MX Range. **£28 (d)**

PRINTER BUFFER & SHARERS

BUFFALO 32K Buffer for EPSON PRINTERS: This compact 32K buffer can be fitted internally on most EPSON printers within a few minutes. It does not require external power or any modification to the printer. It will hold about 15 A4 pages of text freeing your computer for other jobs in a fraction of the time it would normally have to wait for the printer to finish all that printing. Supplied with full fitting instructions.

Buffalo 32K Buffer **£75 (d)**

PRINTER SHARER/BUFFER: A unique sharer/buffer that provides a simple solution to improve system utilisation. It can be connected to up to three computers and it will automatically switch between the computers to scan for data — no manual switching required. High speed data input rate to the buffer cuts down the normal waiting time for the computers for the printing operation to complete and thus allowing the computers to be used for other uses. The 64K buffer would hold over 30 A4 pages of text.

Facilities include: COPY, PAUSE AND RESET. LED indication for percentage of memory available and data source. Mains powered. Send for detailed specification.

Available in 64K and 256K versions

TSB 64 £199 (b) **TSB 256 £275 (b)**

A Serial Buffer/Sharer will soon be available. Please send for details.

PERIPHERAL & COMPUTER SHARERS

An extended range of peripheral sharers to allow the user to switch between computers, printers and modems. High quality switching mechanisms housed in fully shielded metal cases ensure reliability. No external power input required.

All lines on the sharers are fully switched (36 on parallel and 25 on serial)

	Parallel	Serial
3 Computers to a Printer	36V36-3 £69(c)	25V25-3 £64(c)
4 Computers to a Printer	36V36-4 £85(c)	25V25-4 £74(c)
2 Computers/2 Printers x-over	36V36-X £69(c)	25V25-X £69(c)
BBC Cable Set 3 to 1 (1m ea).	£32(c)	£34(c)
BBC Cable Set 4 to 1 (1m ea).	£39(c)	£41(c)

BBC Computer Sharer: TCS26:
1 computer to 2 printers fitted with Cable. **£19.50 (c)**

EPSON HI-80 PLOTTER

EPSON technology has once again scored a first by introducing a sophisticated A4 size plotter that does not need specialised software or programming skills to operate it and yet keep the cost within the reaches of all computer users. Features include 4 pens at a time — upto 10 colours to choose from, a variety of pen nibs, high speed plotting. Powerful software command codes include single commands to plot circles, eclipses or triangles. Line or bar graphs and pie charts can be plotted in a variety of exciting styles very simply by keying in the data into the computer.

Detailed leaflet on request.

Epson HI-80 Plotter **£325 (a)**

HITACHI 672 PLOTTER

A high speed, compact A3 plotter with 4 colours and high accuracy. Both serial and parallel ports as std. Plots on either OHP film or plain paper. Operates on HP GL or single character commands and is easy to interface to most graphics software. **£465 (a)**

GRAPHICS PLOTTER

Available again with considerable enhancements to the original model. Plotting area has been increased to A3 size with a resolution of 0.1mm. Opto sensor converts the plotter into an input device to scan and digitise pictures, traverse mazes and investigate methods of artificial intelligence. A more powerful drill/router attachment and scriber provide facilities for drilling on various materials and fine line drawing on coated materials.

Total cost: **£629 (a)**

Basic plotter and accessories available separately. Send for details.

PLOTMATE

From Linear Graphics a range of fast, accurate and easy to use plotters.

The A4 Plotmate is the ideal drawing companion for all BBC micros, the Master and Cambridge Work Station. Plugs into the user port or printer port of your BBC Micro and directly driven by the BBC graphics commands in BBC Basic, Logo or indeed any high level language without additional driver software.

Plots onto paper, card or acetate film in up to 6 colours using fibre, OHT or ballpoint pens.

A4 Plotmate £299 (a)

A4M and the new A3M models plug into BBC and all leading micros. They run on a wide range of Linear Graphics and third party software. Numerous functions and add-on capabilities ideally suited to the requirements of the Education, Industry and Business environments including mathematical modelling, data display, CAD, mapping, optical scanning and PCB design.

A4M £399 (a) **A3M £549 (a)**

PRINTER ACCESSORIES

EPSON ACCESSORIES:

Interfaces:
8143 RS232..............................£28 (d)
8148 + RS232 + 8K......................£75 (d)
8165 IEEE + Cable......................£65 (d)
8148 RS232 + 2K........................£57 (d)
8132 Apple II..........................£60 (d)
8177P NLQ for FX80 + /FX100 +..........£99 (d)

Parallel & Serial Buffers of various size also available.

FX80/80 + /85 Tractor Attachment........£37 (c)
FX80/80 + Paper Roll Holder..............£17 (c)
LX80 Tractor Feed........................£20 (c)
LQ800 Tractor Feed.......................£44 (b)

SHEET FEEDERS:
8338 LX80................................£49 (b)
8333 FX100 + /105........................£169 (a)
8331 FX80 + /85..........................£129 (b)
8330 RX80 +..............................£129 (b)
LQ800....................................£129 (b)

Ribbons:
RX/FX100/100 +. FX105.......................£10 (d)
RX/FX80/80 +, FX85..........................£5 (d)
LX80..£4.50 (d)
H180 Pen Set (Aqueous/Ball point)...........£7.50 (d)

Dust Covers:
FX80..£5.50 (d)
TAXAN/Canon KP810...........................£6 (d)
FX100........£7.50 (d) **KP910**............£7 (d)

TAXAN CANON Accessories:
RS232 + 2K buffer...........................£78 (d)
Ribbon......................................£6 (d)

JUKI 6100
RS232 Interfaces............................£65 (d)
Tractor Feed................................£129 (a)
Ribbon (Carbon).............................£2.00 (d)
Spare Daisy Wheel...........................£14 (d)
Sheet Feeder................................£182 (a)

BROTHER HR15
Daisy Wheel.................................£18 (d)
Tractor Feed................................£90 (a)
Ribbon (Carbon/Nylon).......................£3.00 (d)
Sheet Feeder................................£182 (d)
Keyboard....................................£135 (a)

Printer Leads:
BBC Parallel Lead (1.2m)....................£6 (d)
BBC Serial Lead (1.2m)......................£6 (d)

Other lengths can be supplied on order:
IBM Parallel Lead (2m)......................£12 (d)

PAPER & LABELS
Plain Fanfold paper with micro perforations:
2000 sheets 9½" × 11"........................£13 (b)
2000 sheets 14½" × 11"......................£18.50 (£4.50)

Labels/1000:
Single Row 3½ × 1 7/16".....................£5.25 (d)
Triple Row 27/16" × 17/16"..................£5 (d)

MULTIFORM Z80

The MULTIFORM Z80 2nd Processor for the BBC Micro — opens the horizons of CP/M software to the BBC micro user

* Will enable running of almost any CP/M applications software
* Will enable transfer of data between different disc formats
* Emulates the two terminals most frequently used by CP/M software

MULTIFORM Z80 interfaces directly to a normal BBC micro requiring no hardware changes. It is supplied with OS/M operating system in rom which can run all software that obeys CP/M 2.2 constraints and its configuration is not hardware specific.

MULTIFORM Z80 is truly flexible and can be used with any BBC micro drive system, single or dual drive, 40 or 80 track format and single or double sided. Unlike other currently available Z80 processors for the BBC micro, there are absolutely no restrictions on the type of drive that can be used with the MULTIFORM Z80.

MULTIFORM Z80 plugs into the 1MHz bus connector of the BBC micro. It is mains powered and does not put any extra load on the BBC's psu. The data cable can be several feet in length, allowing convenient siting of the MULTIFORM Z80, unlike present second processors, which have 8" cables.

Twenty eight CP/M formats are supplied which include: Acorn Z80, RML 380Z and 480Z, Torch (read only), Osborne, Televideo . . . we also offer to configure other formats at an extra charge."

Rom based OS/M operating system is fully compatible with Acorn's single and double density disc interfaces. Installing the OS in rom allows more space on discs for programs and data and response to system commands is very fast. (Note: Single density DFS will only read/write to single density CP/M formats).

MULTIFORM Z80 can format, read or write from a very wide range of CP/M disc formats. On a dual drive system, the drives can be set up independently to run two different formats at the same time. This will enable:

* The user to buy software from a very wide range of suppliers without having to worry about the type of format supplied.
* Interchange of valuable data and files among users of various CP/M computers.
* Using a system at home for preparing data required in the office.
* Software writers/developers to write software in any one format and transfer it to any other format without having to pay for expensive porting charges.

MULTIFORM Z80 is supplied with a library of a number of popular CP/M formats and a utility disc containing a program for creating files for the additional formats. Each library can load 32 formats and there are no restrictions on the number of librarires that can be created.

The utility disc also contains a program to interconvert ASCII texts wordprocessed on a normal BBC and under OS/M or CP/M.

MULTIFORM Z80's terminal emulation includes the ADM-3A, the HAZELTINE 1500 and the BBC VDU making the installation of most of the well known CP/M software easy.

MULTIFORM Z80 converts your BBC computer into an almost universal CP/M machine and adds the power of being able to run two different formats simultaneously, which currently is possile on only the very sophisticated specialist machines.

For any one working or intending to work in a CP/M environment, MULTIFORM Z80 is an indispensable tool.

In offices where there are a multitude of CP/M machines and a few BBCs, MULTIFORM Z80 will prove to be invaluable for transferring data between the various CP/M machines.

MULTIFORM Z80 (including utility disc, library disc and manual) **£299 + £4 p&p**

(When ordering please specify the type of DFS, MULTIFORM Z80 will be used with)

SPECIAL MULTIFORM UTILITY to read and write to IBM PC Disc. **£49 (d)**

CP/M SOFTWARE FOR TORCH & ACORN Z80 PROCESSORS

We can now supply almost any CP/M based software package in a format suitable for the Torch Z80 and Acorn Z80 second processors. Phone for details on prices for popular packages for IBM

Please phone for our new professional software catalogue

WORDSTAR PROFESSIONAL The advanced word processing package comprising of WordStar, MailMerge, StarIndex and SpellStar, a total combination offering substantial savings on individual prices. WordStar is the best selling word processing program on the market. Extensive operator aids include a comprehensive friendly manual, step-by-step training guide, command cards, on-screen menus. Spellstar checks text files against its 20,000 word-plus dictionary. You can both add to the dictionary and create specific supplementary ones. Mailmerge is ideal for mailing applications. It enables the fast production of personalised form letters, mailing labels, invoices, etc. StarIndex creates alphabetical indexes, tables of contents, paragraph numbering etc.

WORDSTAR PROFESSIONAL £310 (a)
WORDSTAR £275 (a) WORDSTAR Upgrade to W/S Prof £195 (a)

DBASE-II Undoubtedly 'The Database', can be used for an almost limitless number of business applications, ranging from mailing list preparation through to running accounting ledgers and payrolls. An on-disc tutorial takes you from setting up a simple file all the way through to setting up custom screens and reports. Automatic calculations may be performed on data. Fields or entire databases may be modified or replaced with single, English-like basic commands; Dbase-II can therefore be used by general personnel having no programming knowledge. It can be tailored to suit a variety of professions and individual needs, with files such as accounting, payroll, time billing, job costing, scheduling and mailing lists. It can access several files at a time. It is fast, flexible and powerful. **£310 (a)**

SAGE ACCOUNTS: This package has been designed for the smaller business, for the user who is unfamiliar with computers but wanting or needing to computerise the bookkeeping and accounting functions. Sage is easy-to-learn and easy-to-use and is complete with a full tutorial booklet and a free manufacturers 90-day 'Hot-Line' support. It is a truly integrated package (all on one disc!) and covers Sales, Purchase & Nominal Ledgers, with a capability of handling up to 999 accounts per ledger. It will handle all your Sales and Purchase invoices and can easily generate account & management reports. **£375 Sage plus (£695)** for the larger business, and **Sage Payroll (£195)**

Other packages available include PRO-PASCAL, CIS-COBOL, Supercalc II, MACRO-80 etc. Please telephone with your requirements.

MicroPros
Pocket Series for Acorn and Torch Z80 Processors to be available early July.
Please phone for details.

IBM SOFTWARE: We are able to supply most popular software packages including: WORDSTAR, WORD, EASY-WRITER, DBase-II & III, LOTUS-1-2-3, VISICALC, SAGE etc. Please telephone with your requirements.

PROFESSIONAL SOFTWARE PUBLICATIONS

Wordstar made easy	£16.95 (c)
Introduction to Wordstar	£17.95 (c)
Wordstar Handbook	£11.95 (c)
dBase-II for the first time user	£16.95 (c)
Understanding dBase-II	£22.95 (c)
Understanding dBase-III	£22.95 (c)
Multiplan Made Easy	£18.95 (c)
Multimate Complete Guide	£16.95 (c)
ABC of LOTUS 123	£15.95 (c)
The RS232 Solution	£17.95 (c)
CP/M Bible	£15.95 (c)
Soul of CP/M	£14.95 (c)
CP/M Handbook	£14.95 (c)
Mastering the CP/M	£17.95 (c)
Computer Spreadsheets	£7 (d)

(no VAT on books)

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(d) £1.00

MONITORS

(All Monitors supplied with BBC Lead)

RGB MONITORS

1431 14" RGB Std Res	452 × 585 pixels	**£179 (a)**
1451 14" RGB Med Res	653 × 585 pixels	**£229 (a)**
1441 14" RGB Hi Res	895 × 585 pixels	**£375 (a)**

MICROVITEC 14" RGB/PAL/Audio

1431AP 14" Std Res	452 × 585 pixels	**£199 (a)**
1451AP 14" Std Res	653 × 585 pixels	**£275 (a)**

The above monitors are available in plastic or metal case.

MICROVITEC 20" RGB/PAL/Audio

2030CS 20" Std Res **£380 (a)** **2040CS** 20" Hi Res **£685 (a)**

TAXAN 12" RGB

K12SV3: A high performance high res monitor with desk matt screen with options to switch to monochrome green/amber. IBM Compatible **£324 (a)**

MITSUBISHI XC1404 14" Med Res RGB:
BBC/IBM Compatible. A new monitor with etched dark screen with both brilliance and contrast controls giving sharp graphics and text display. **£219 (a)**

MONOCHROME MONITORS

TAXAN

KX1201G 12" HI-RES green etched screen	**£90 (a)**
KX1203A 12" HI-RES amber etched screen	**£105 (a)**

PHILIPS

BM7502 12" HI-RES green screen	**£75 (a)**
BM7522 12" HI-RES amber screen	**£79 (a)**

ACCESSORIES

Microvitec Swivel Base (14" plastic monitors)	**£20 (c)**
Taxan Swivel Base for mono monitors with integral clock	**£22 (c)**
Philips Swivel Base	**£14 (c)**
Monitor Stand. BBC B+B **£10 (c)** Master	**£12.50 (c)**
Double Tier Plinth. BBC B+B	**£19.50 (b)**
Taxan RGB Cable **£5 (d)** Microvitec RGB Cable	**£3.50 (d)**
Monochrome BNC/PHONO Cable	**£3.50 (d)**

TOUCHTEC-501

Designed for use with Microvitec metal cased monitors, and using the RS-423 socket, this unit brings genuine touch-screen operation to your BBC. Ideal for the educational users. Supplied with a users handbook and utilities disc containing starter programs and development software.
Touchtec 501 **£255 (b)**

EPROMER II



A sophisticated eprom programmer that handles the full range of popular single rail eproms (incl 27256) and allows the user full control of the programming process.
Its powerful menu driven software makes the programming of eproms simple, efficient and eliminates the need to have fiddly switches for selecting eprom types, programming voltage or method. The features include:

* Integral power supply ensures no power drain from the computer.
* Interfaces through 1 MHz bus, fully buffered.
* Clear and simple instructions displayed on the screen make the programming easy for both the first time user and the advanced user.
* Eproms upto 16K (27128) programmed in single pass (27256 in two passes).
* Selectable programming voltage 25/21/12.5V
* Selectable programming method — normal or high speed algorithmic. High speed programming enables 27128 to be programmed in just over 2 mins. Normal programming skips addresses with FF data to increase programming speed. Automatic verification on completion of programming.
* User can select any section of the eprom from a single byte to its full address range to Blank Check/Read/Program/Verify enabling program development/changes very simple.
* Full screen editor with HEX/ASCII input.
* Data input from keyboard/Tape/Disc/Eprom.
* Software interface for integration of user's special requirements.
* Constant display of all options selected.
* Several BBC BASIC programs can be entered on a single eprom.
* Checksum facility allows for easy identification of programmed roms.
* Enter OS Commands from within the epromer program.

EPROMER II with Manual & Software on disc **£99 (b)**
ROM image of software supplied on disc for use with sideways ram.
ROM based software if required. **£5 (d)**

UV ERASERS

UV1T Eraser with built-in timer and mains indicator. Built-in safety interlock to avoid accidental exposure to the harmful UV rays. It can handle up to 5 eproms at a time with an average erasing time of about 20 mins. **£59 (b)**
UV1B as above but without the timer. **£47 (b)**

PORTAL ROM EMULATOR

NEW

Real time evaluation of all listed eproms at 150 ns — hundreds of times faster than a typical eprom write/erase cycle (4Kbytes/sec, no erase time) — completely software driven (by Meta Assembler) — compatible with 'piggy-back' processors.

Don't blow an eprom each time you test your code on your target system! Use a PORTAL eprom emulator instead. Upto four independent PORTALS can be used on the same BBC lead. Each PORTAL has a length of cable with 28 pin header which plugs into the eprom socket you need to emulate — and thats it. All the rest is handled by META. Your code is sent down to PORTAL during assembly, with various options ie two PORTALS for 16bit data bus, sequential PORTAL skipping etc.

PORTAL is supplied in a custom steel case with 13 LEDs to indicate the state of its various functions. Comprehensive documentation and software are included.

Two versions of PORTAL are currently available.

PORTAL 128 (2716/2732/2764/27128) **£185 (b)**
PORTAL 512 (all above +27256 and 27512) **£285 (b)**

Please send for detailed specification sheet

REAL-TIME CLOCK CALENDER

A low cost-unit, allowing the facilities of units costing far more. Built to professional standards, it opens up the total spectrum of Real-Time applications. Possibilities include desk diary/planner, calender, continuous display of on-screen time and date information, automatic document dating, precise timing and control in scientific applications — its uses are endless. Simply plugs into the user port — battery backup is supplied as standard. A full manual as well as extensive software including a simple demonstration diary/planner application program on disc. **£29 (d)**



ROM/RAM EXPANSION SYSTEMS

ATPL SIDEWISE ROM EXPANSION BOARD A well constructed expansion board, simple to instal and requires no soldering. All buses are buffered. It allows full sidewaysd rom expansion to 16 ROMs. One socket has been split into two 87K sockets to allow the use of 8K CMOS RAM. Battery backup option allows data retention in the RAM when the computer is switched off. Several link selectable options including write protect for the RAM. ATPL Board **£37 (d)** Battery Backup Kit **£18 (d)**

COMPUTER VILLAGE CV-16 Rom Board **£38 (d)**

A neatly designed, simple to instal board allows full sideways rom expansion on the model B. Two sockets for 8K CMOS RAM allow a total of 16K for which battery back is fitted as standard. **£35 (d)**

RAMROM-15 The advanced sideways ROM/RAM expansion system. This is an external unit, using high quality construction. attractively packaged in a BBC coloured metal case, allowing easy access to all the sockets. No soldering is required. Allows 11/12 additional sideways ROMs to be fitted with an option of up to 16K sideways RAM. All commonly available RAM can be used i.e. 4801/6116/6264 or xx128. Battery back-up fitted as standard. For development work and further expansion, most of the 6502 processor signals are available. Supplied with utility disc and full instruction manual. **£79 (b)**

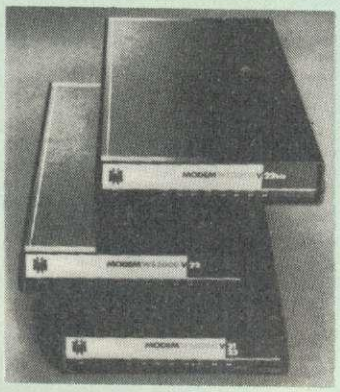
(Above boards are for use with standard BBC computer and not compatible with B plus unless specifically mentioned)

COMMUNICATIONS

MIRACLE WS3000 Range: * A new, professional series of intelligent modems with full auto dial and auto answer facilities as standard. * HAYES protocols are implemented allowing the use of a wide range of well proven communications software. 'Plain English' command structure simplifies the use of the modem even for the first time user. * All models feature a centronics compatible printer port allowing direct output to a printer. * A line sharing facility that allows WS3000 to differentiate between calls intended for data, and those for speech. * An intelligent speed buffered RS232 port and a wide range of available data rates makes this one of the most powerful multi speed range of modems available. * Line noise filtering ensures error free transmission and reception of data on long or noisy lines. * Internal battery backup allows storage of 63 names and telephone nos. * This range of modems can be factory fitted with high security data access protection system. * Models V2123 and V22 can be factory upgraded to V22bis standard giving a single compact modem capable of data rates from 75bps to 2400bps.

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out in them.

WS3000 V21/23: This modem complies with the CCITT V21, V23 and Bell 103 standards and operates at CCITT standards for 300bps, 75/1200bps, 1200/75bps full duplex, 600bps and 1200bps half duplex, and the Bell standard for 300bps full duplex. **£295 (b)**



WS3000 V22: This modem operates on all V2123 standards plus V22 standard for 1200bps full duplex V22bis standard. **£495 (b)**

WS3000 V22bis: This modem operates on all V21/23 and V22 standards plus 2400bps full duplex. **£650 (b)**

BBC Data Cable for WS3000
£6 (d) Data cables for other micros available.

NEW

WS4000/'SCHOOLS' MODEM, a new low-cost high performance 'Hayes' intelligent modem with A/Dial and A/Answer and V21/23 at **£149 (b)**

A **V22** upgrade can be added at **£250,** and **V22bis** at **£405.** Other options, all priced at £50 are battery backup, Bell standards, Call Monitor, Control port and Tone Dialling.
Please send for full details.

MIRACLES WS2000 This highly successful world standard modem, having BT approval, covering V21, V23, (BELL 103/113/108 outside the UK) and including 75,300,600, 1200 Baud ratings. What possible gives this modem its biggest advantage is its option of computer control. A 25Way RS232 input as well as possible computer controlled auto/dial/auto-answer makes this modem unique.

WS2000 £102 (c) Data Cable **£7 (d)**

WS2000 Auto-Dial card: includes an integral loudspeaker for monitoring of the phone line **£30 (d).**
BBC User Port cable (for modem control) **£4 (d)**

WS2000 Auto-Answer Card £30(d).
(Please note that the A/D & A/A Cards are still awaiting BABT Approval.)

SKI KIT (Allowing total control of the modem by your computer) **£10 (d)**

DS1 Disc (for Commstar): When used with the Auto-dial card, SK1 Kit, and a user port cable, this software will dial out to Prestel, enter your password etc. and leave you in Commstar. Will also store many bulletin board telephone numbers and protocols for autodialling **£10 (d)**

GEC DATACHAT 1223 Modem: An economically priced BABT approved modem complying with CCITT V23 standard capable of operating at 1200/75bps and 75/1200bps and 1200/1200bps pseudo full duplex. It is line powered does not require external power source. It is supplied with software suitable for connecting to PRESTEL, Micronet 800, Telecom Gold and a host of bulletin boards. SPECIAL OFFER **£75 (b)**

As reviewed in June issue of Acorn User
'Worthwhile and above all easy to use package'

COMMUNICATIONS SOFTWARE

DATA-BEEB An advanced communication ROM from Miracle Technology. Its many features include both Viewdata (Prestel) and Terminal modes, Auto-Answer and Auto-dial for fully expanded WS 2000's etc. Macro facilities allow flexible use of its many facilities e.g. automatic dialling, log-on, going to a specific page, printing it, and going off-line, all in one operation. **£24 (d)**

TERMULATOR An advanced terminal emulator on a 16K Rom. Emulations include VT52/100, Tektronix 4010 etc. Allows a BBC to be used as a terminal for almost any mainframe computer or computer network. **£25 (d)**

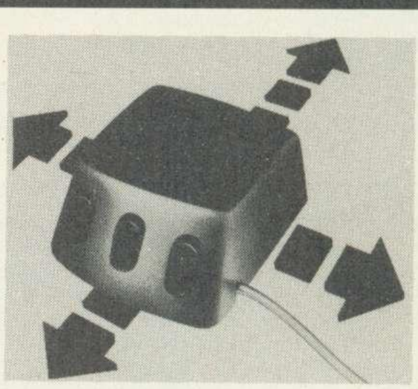
COMMUNICATOR This is a full 80 col VT100 terminal emulation program on 16K eprom. It is a more advanced program than TERMI and features easy to follow screen menus. The rate at which data is sent or received is easily set up with rates up to 19200 Baud with 80 column text. Allows files to be transmitted from disc, or a copy of incoming data to be sent to a file or to a printer. (Communicator is not suitable for PRESTEL). **£49 (d)**

RS232 Solution (Book) **£15.95 (c)**

COMMSTAR An ideal communications rom for both Prestel and bulletin boards. Facilities include Xmodem, clock etc. **£28 (d)**

RS232 Solution Book **£17.95 (c)**

AMX MOUSE with SUPERART



The mouse will now be available with enhanced software, the 'SUPER ART' which is compatible with 6502 2nd processor, the ARIES RAM board, BBC+ shadow mode, tape and ACORN DFS and ADFS. Allows full use of colour in mode 1. Disc users can create colour pictures in A4 size with dot pattern editing, use of icons, additional text styles, superb zoom in colour.
There is a variety of optional software to make the mouse one of the most versatile peripherals that can be added to the BBC micro.

AMX Mouse with Super Art **£67 (d)**
AMX Super Art Package on its own **£43 (d)**
AMX PAGEMAKER provides a high resolution A4 Typesetting and Artwork system. **£43 (d)**
AMX 3D ZICON will let you transform three dimensional vector data and translate them into 3D on screen graphics. **£21 (d)**
AMX DATABASE is a new filing system with 1000 records per file and unlimited number of fields per record. **£21 (d)**

Fleet Street Editor £38 (d)

RB2 TRACKER BALL

A precision built tracker ball. Software allows RB2 to function instead of cursor keys, for word processing, CAD/CAM etc. Software includes a graphics/CAD package.

RB-21 (with 'icon artmaster'). **£59 (c)**
16K ROM for cursor control on the Master computer. **£12.50 (d)**

BBC COMPUTER SPARE PARTS

Complete Keyboard	£52	UPD7002	£5.00
Power Supply Unit	£52	DS3691	£3.50
Keyswitch	£1.75	7438	£0.40
Keyboard Connector	£4.00	74LSOO	£0.24
Video ULA	£18.00	74LSO4	£0.24
Serial ULA	£14.00	74LS10	£0.24
UHF Modulator	£4.50	74LS123	£0.80
6502A 2MHz CPU	£6.50	74LS163	£0.75
65C02 CMOS CPU	£12.00	74LS244	£0.80
6512AP CPU	£12	74LS245	£1.10
6522 VIA	£3.50	74LS373	£0.90
6522A 2MHz VIA	£5.50	74LS393	£1.00
LM3 24 op-amp	£0.45	8271	£46
SAA 5050-Teletext	£9.00	88LS120	£3.00
6845SP CRT Controller	£6.50	4464 RAM	£8.00
		O/S Basic B+	£25

All the above carry Carriage Code (d)

MERLIN

MERLIN is the ultimate utility ROM for the BBC and BBC PLUS (Master coming soon) — an optimum combination of the most useful, of Disc, Memory, and ROM management utilities. A total of no less than 57 essential commands ensure that this will be the last utility ROM you will purchase. It is suported by a 106 page comprehensive manual with detailed syntax, argument and error messages for each command, and all the utilities are fully 'Tube' compatible.

A selection of just some of the commands include:

APPEND — append Basic files
ARCHIVE — a unique disc/tape archive system
CDIS — a 6502/65C02 disassembler, also able to disassemble sideways
ROM/RAM and optional printer output.
CLONE — protected disc copier.
DBYTE — Disc byte search utility.
DSTRING — disc string search utility allowing localised string search.
DUAL/SWAP — allows second catalogue on disc for 60 files/side of disc.
EDSEC — an interactive disc editor, able to directly access sectors, read and write to sectors marked deleted, and editing of protected discs.
FORM — a formatter able to format all or part of disc.
GPACK/GEXPAND — an all-mode screen file compacter/expander enabling saving of upto 70% of screen memory.
MBYTE/MSTRING — memory byte/string search utility.
MEDIT — interactive memory editor.
REPAIR — atempts to recover data from a track and repair.
ROFF — disable a ROM.
SEDIT — interactive 'protected-disc' editor.
ZDUP — disc backup/format utility for ACORN & TORCH Z80 users.

As there are so many new commands, we have prepared a detailed leaflet describing all the commands — this is available on request.

MERLIN £37.50 (b)

FIRMWARE AND SOFTWARE

LANGUAGES

META-ASSEMBLER: For full details please see page 6 of this advertisement.

6502 DEVELOPMENT PACKAGE A Macro-Assembler with utilities for use with the 6502 2nd Processor. Enables the serious programmer to develop large programs in assembly language. £39 (d)

ACORN MICRO-PROLOG: The logic programming language seen as the language for programming in the future and used extensively in the artificial intelligence field. A simple 'front end' is supplied to make syntax more user friendly for new users. 16K Rom, manual and extension modules. £62 (c)

ISO-PASCAL Acorn's full implementation of International Standard Pascal on two 16K ROMs. Disc Version for use on 6502 2nd Processor also supplied. Comprehensive manual. £47 (c)

ISO PASCAL Stand ALONE GENERATOR: Utility to convert programs produced using ISO PASCAL for stand alone applications. £28 (d)

ACORN LOGO A full implementation of the Logo language from Acornsoft. Supplied as two ROMs with a tutorial course and technical manual. £42 (b)

LOGOTRON logo £56 (c)

BCPL A full implementation of the BCPL compiler language consisting of the language of ROM, disc containing the BCPL compiler, a screen editor, a 6502 assembler, other utilities and programming aids and examples of BCPL code and a 450 page manual. £42 (b)

BCPL CALCULATIONS PACKAGE Supplied on disc, it supports floating point, fixed point and fast integer calculations. It includes the BCPL calcultion files, example files and a comprehensive user guide. £15 (d)

BCPL STAND ALONE GENERATOR £36 (d)

Acorn LISP Rom, Acorn FORTH Rom, Acorn COMAL, (each) £39 (d)

MICROTEXT A frame based authoring system from National Physical Laboratory for interactive computer tutoring. Disc based. Disc £49 (c)

OXFORD PASCAL A fast, compact P-Code compiler, that fully utilises BBC Graphics and sound, contains a powerful editor, and produces 'standalone' software. (Specify 40/80T) £35 (c)

DATABASE MANAGEMENT SYSTEMS

VIEWSTORE..............£37 (d)
STARdataBASE...........£49 (d)
MASTERFILE II......£17.00 (d)
GEMINI'S DATAGEM..£59 (c)

WORD-PROCESSORS

VIEW........................£37 (d)
VIEW VERSION V3.0....£56 (c)
VIEW PRINTER DRIVER GENERATOR......................£8 (d)
VIEWSPELL..............£29 (a)
WORDWISE................£25 (d)
WORDWISE PLUS.......£42 (d)
EDWORD II..£42 (a)
HI VIEW......................£36 (c)
VIEW INDEX...............£9 (d)
WORDEASE...........£24.50 (d)
SPELLCHECK III.........£31 (d)
INTERWORD.............£49 (d)

SPREADSHEETS

VIEWSHEET Acorn's spreadsheet provides 255 columns and 255 rows and will operate in any mode. Windows can be created which can then be rearranged to provide any print format required. Function keys provide for easy entry of commands. Printer control codes can be used using the printer driver. Fully compatible with VIEW and the 6502 2nd Processor. £37 (d)

VIEWPLOT: A disc based Linear graph/barchart/piechart plotting program. £25 (d)

INTERSHEET The new spreadsheet from Computer Concepts. Many advanced facilities including 105 character display, several spreadsheets may be used at once, may be used with View & Wordwise etc. etc. £45 (c)

INTERCHART Graphics Package for the Intersheet. £30 (d)

ULTRACALC £39 (d)
QUICKCALC £14.50 (d)

UTILITIES

ACCELERATOR.........£49 (d)
BROM.......................£28 (d)
TOOLKIT plus............£31 (d)
HELP II....................£27 (d)
DISCMASTER..£18 (d)
ACORN GRAPHICS ROM GXR. £21 (d) (specify BBC B or PLUS)
COMPUTER CONCEPTS GRAPHICS ROM...........£20 (d)
PRINTMASTER......... £25 (d)
FONTWISE.............. £10 (d)
HERSHEY CHARACTER FONT GENERATOR............ £18 (d)
ICON MASTER...........£29 (d)
BILLBOARD..............£18 (d)
ACORN'S CREATIVE SOUND........................ £15 (c)
ACORN'S SPEECH PROCESSOR ROM......£15 (d)
PROGRAM BUILDER..£18 (d)
DATABEEB...............£24 (d)
COMMSTAR..............£26 (d)
ACORN BASIC EDITOR £24 (d)
SLEUTH....................£24 (d)
EXMON-II.................£22 (d)
DISC DOCTOR..........£26 (d)
DUMPMASTER II ..... £26 (d)
FONTWISE PLUS.......£16 (d)
STUDIO EIGHT.........£19 (d)
CC SPEECH ROM......£28 (c)
CC TEXT TO SPEECH................£34.70 (d)
ROMIT......................£29 (d)
REPLICA III..............£12 (d)
COMMUNICATOR......£49 (d)
TERMULATOR..........£25 (d)
MINI OFFICE II.......£14.75 (d)

When ordering software on disc please specify track format (40/80)

BOOKS

No VAT on books; Carriage (c)

LANGUAGES:
6502 Assy Lang Prog............£19.95
6502 Programming..............£16.95
8086 Book.........................£23.95
Acorn BCPL User Guide........£15.00
Acorn FORTH......................£7.50
Acorn LISP..........................£7.50
S-PASCAL...........................£7.50
Acorn ISO Pascal Ref Manual.£12.50
Intro to COMAL..................£10.00
Intro to LOGO.....................£7.50
Micro Prolog Ref Manual.......£12.50
Creative Sound....................£7.50
Introduction to Pascal..........£16.50
Prog the Micro with Pascal.......£8.50
The UNIX Book....................£7.50
Unix User Guide..................£19.95
Understanding Unix.............£18.45

BBC MICRO BOOKS FOR BEGINNERS:
BBC User Guide Acorn..........£15.00
BBC PLUS User Guide..........£15.00
Drawing your Own BBC Programs £6.95
Introducing the BBC Micro......£4.50
Mathematical Programs in BBC Basic

PROGRAMMING/UTILITY
Advanced User Guide...........£12.50
Adv BASIC Rom User Guide....£7.50
Advanced Prog Tech for BBC...£8.95
Applied Ass./Lang on the BBC £9.95
BBC Micro Advanced Programming £9.95
BBC Micro Sideways ROM's RAM's £9.95
BBC Micro Sideways Roms B. Smith............£9.95
Guide to the BBC ROM..........£9.95
Exploiting BBC BASIC..........£6.95
Further Programming for BBC £4.00
Programming the BBC...........£6.50
Structured Programming.........£6.50
Using BBC BASIC...............£10.00
View 3.0 User Guide.............£12.50
Viewstore..........................£12.50
Viewsheet..........................£12.50
Word Processing on BBC (Wordwise + Epson)............£5.25

SOUND & GRAPHICS:
Advanced Graphics with BBC...£6.00
BBC Graphics & Sound..........£7.50
Creative Sound on the BBC......£9.95
Graphics on the BBC Micro......£6.00

DISC DRIVE SYSTEMS:
Advanced Disc User Guide.....£14.95
BBC Micro Disc Companion....£7.95
Disc Book...........................£3.50
Disc Programming Techniques..£7.95
Disc Systems.......................£6.95

APPLICATIONS:
BBC Filing Systems & Databases £7.95
Business Programming on BBC £7.95
Business Applications on BBC..£7.95
DIY Robotics & Sensors..........£6.95

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(d) £1.00

LETTERS

Write to Letters, Acorn User, 141-143 Drury Lane, London WC2B 5TF

PRINT A BARGAIN

Sir, Might I bring to your attention what in my view is a bargain in the world of printers, namely the Amstrad DMP2000.

It is a dot matrix printer with NLQ, which appears to be Epson RX-compatible and I bought mine for £136. It seems very similar to a Riteman F+ printer which costs over £250. After modifying the supplied printer lead it works perfectly well with my antique Beeb (issue 3!).

What's more, the manual gives instructions for the BBC micro as well as for Amstrad micros. The text quality is much better than the Epson LX80, which I nearly bought until an Amstrad-owning colleague told me about the DMP2000. It's much quieter and, since it's a flat-bed printer, it will print addresses on envelopes.

I have been awaiting its appearance in your magazine, certain that someone would have noticed it before, but since they haven't, then thought I'd tell you!

K G Schofield
Derby

DON'T WRITE THE BEEB OFF

Sir, I am writing in reply to the letter sent by I S Gibson from Kent (May issue) criticising Acorn.

While I agree that the documentation supplied by Acorn is not as good as it could be, I feel some of the other comments are quite unfair.

I am sure that if all us BBC microcomputer users could have bought a 32-bit computer including disc drive and monitor for £400 three years ago (or indeed any computer), we would have done so.

Despite the lack of memory on the BBC micro it is still possible to write sophisticated and complex software. If we look carefully at our programming techniques, many of the memory problems can be overcome.

I have written many programs which are being used daily in my firm and the BBC micro has proved to be a great asset.

Obviously the modern computers are going to be more powerful than the older generation, but surely this is the price of progress.

Reg Smith
Cambridge

TERMULATOR VS TERMINAL

Sir, There is a slight misrepresentation in your 'ROM Compatibility Chart' (May issue, page 120). The entry for *Termulator* indicates that it is supplied with the Master 128, which is not the case! A very simple 2k *Terminal* program is supplied with the Master in the 1Mbit ROM: *Termulator* is an entirely separate product extending to a full 16k. The same mistake was also made in the April edition, in your 'Ready Reckoner'.

I hope you will be able to publish a corrected chart in the near future. This particular area of confusion (*Terminal* vs *Termulator*) should be cleared up as soon as possible for the sake of the users!

Paul Fellows
Acorn Computers

FUTURE FOR THE MASTER

Sir, Your articles on the new Master series have proved very informative and interesting. However, there are some points which I would like to raise.

First, the price. £500 for an 8-bit computer is a bit steep given the competition's pricing. As an example, for another £100 it is possible to buy an IBM-compatible (albeit without a DOS). OK, the Master does have *View* and *ViewSheet* included in the price, but the available software and hardware base for IBM compatibles is much larger and more diverse, particularly from the business user's point of view. Add another £500 for the MS-512 and there is simply no contest.

Second, the DFS. The vast majority of BBC micro owners will be using a DFS which conforms to Acorn's specification. To make full use of the Master series, a switch to ADFS is mandatory, but no mention has been made in your articles on how to do this.

In conclusion, I cannot see any future for me with the Master series. If and when I do upgrade my computer, it will undoubtedly be to an IBM clone, a decision based purely on cost and software/hardware availability.

David Raison
Jump Systems Ltd
Sussex

The Master comes with a utility called 'Copyfiles' on its Welcome disc. This allows you to copy DFS files onto an ADFS disc. Bruce Smith copied three 80-track discs full of *Wordwise* files onto one ADFS disc (with plenty of room to spare). However, this did take 45 minutes.

We're looking at doing it using sideways RAM to help.

GRAPHICS LAUNCH-PAD

Sir, The super program by Mike Williams ('The Last Detail') in the March issue of *Acorn User* has stimulated me into producing the reproduction of a local beauty spot (figure 1 below).

Having a keen eye for detail, your program was most welcome as I searched for software to put the finishing touches to this mode 4 'masterpiece' – created freehand from the keyboard.

So, you've given me a launch-pad into graphics as I dip my toes further into this fascinating and rewarding area.

If it hadn't been for your timely program, I would not have persued 'The Last Detail'.

Paul Bayley
Malvern, Worcs

We've launched a Gallery Disc (see page 111 for details) which contains 'Super Painter' from January's issue, March's 'Pixel Editor' and 27 20k pictures, all on one 80- or two 40-track discs.

Other graphics programs which may be of interest are Chris Steele's 'Freehand' article (Oct 1985) and 'Easiplot' by Martin Phillips (Aug 1985).

We've also got a special graphics issue of the magazine coming up in November.

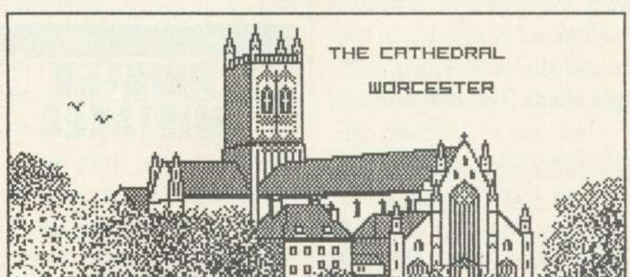


Figure 1. Local beauty produced by Paul Bayley

LETTERS

CHARTING THE ERRORS

Sir, I think you have made some errors on the Top 20 BBC games chart over the last few months concerning the compatibility of games for the BBC B+.

Yir Ar Kung Fu Both disc and tape versions work fine on the B+.

Exploding Fist The versions for sale in the shops do *not* work on the B+; I have tried to get a version which will work from Melbourne House but they sent me the normal BBC B version. I have sent this back to them and wait for a reply. *Fist* is available on disc for £14.95.

Phantom Combat There may be some old versions around which won't work, so make sure it says BBC PLUS on the box.

Speech! I have been told by a Master user that *Speech!* works on the Master with no problem. I don't know about any other Master software.

Southern Belle It is *not* compatible on the BBC B+.

Lord of the Rings (Game 1) Works fine on the BBC B+.

Repton 2 New version works fine on the B+, the old version crashes if you crack open an egg. There is no way of telling from the box if it is an old or a new version, but all the old ones must have been sold by now.

Winter Olympics Works fine on the B+ (costs £8.95 on tape).

Mini Office 2 Works fine on B+. Also available on disc for £16.95.

Night Shade Is *not* compatible on B+. No current Ultimate software works.

The rest of your list is correct.

It may be of use for somebody to know that *Bugeyes 2* only works on the B+ if you LOAD "" up the first program (which is called 'Starman') and then remove lines 41 and 42 (which you can't see unless you list the program to a printer). I don't know what these lines do, but after deleting them type RUN, and the rest of the program loads and runs correctly.

To any software company reading this: if it works on the B+ or Master, say so on the label; if it doesn't, say that it doesn't.

At present I have to ask some kind computer dealer whether I can bring back the software if it doesn't work, then go home and cross my fingers and try to load it. If it doesn't work I have to take it back to the shop and get my money back.

One shop is so fed up with me always taking software back that it's refused to let me do it any more – if I now buy software from them and it doesn't work, I'm stuck with it.

I have even found a piece of software which works on the B+ 64k and not on the B+ 128k; the original *Mini Office* program. Has any body else found this?

Please, *Acorn User*, urge software houses to make their software B+ and Master compatible and to print full details on the label/box. It would be a great help if, when you review software, you check that it works/doesn't work on the B+ and Master and print the results of your test. I am sure this would help fellow B+ and Master users.

J N Willmott
N Humberside

PS: If Acorn Computers doesn't answer my letters soon I'll go mad – I've written four times without any reply!

PRINTER MISTAKES

Sir, Looking at back issues of *Acorn User,* I came across Hints and Tips in the January 1986 issue, and am puzzled by a comment made regarding Epson LX80 printers. It says 'the Epson RX80 does not have reverse feed, but the LX80 does.'

I have looked through my Epson operating manual several times and can find no reference to this command. Was this a mistake on your part, or is there a command not published in the book?

In the December 1985 issue there is a review of printers and here again I am puzzled. It says, regarding the LX80 printer, 'A nice touch is that fonts such as emphasised, double strike, condensed and elite are also available in NLQ mode.'

I am quite unable to get anything more than NLQ pica, enlarged and emphasised out of my LX80. Can you shed any light on these points? I should be most grateful.

I have been taking your magazine for about eighteen months and rate it very highly. Congratulations and keep it up.

John Graham
Southampton

You are quite right to be puzzled. Both the points that you've queried were our mistakes – many apologies for any confusion caused!

HELP WITH LOWER-CASE

Sir, I have an Olivetti printer (SV160) which I got from the company I worked for, but unfortunately there was no manual with it. I can only use the printer to produce upper-case print.

I finally wrote to Olivetti but they didn't bother to reply. I realise that there was no profit in it – I was hoping that my letter might reach some enthusiast who might fish out an old manual and sell it to me.

What I am after is what CHR or VDU commands it understands and how to produce lower-case print? I would be most grateful for any information about this printer.

Thank you for an excellent magazine – I read it from cover to cover.

Alan Kendall
Bristol

PROGRAMS RETRIEVED

Sir, Have you ever come across the problem of a file (on a cassette) which has been damaged and so won't load?

Say the file which is corrupted is called START.

The first thing is to make a dummy file of START to replace the corrupted blocks (it's best to make the dummy file of REM statements).

You then save this program on another tape, also calling it START.

When this has been done, load the original START file as far as you can and when you come to the corrupted part, replace it with the dummy file, loading it past the point where the original was corrupted (if the damage is at the beginning of the tape, you start off with the dummy).

When you're past the corrupted section, replace the dummy tape with the original and load in the rest of the program.

When it's finished loading, the message 'Bad program' will appear, but don't panic! Just load in *Acorn User's* 'Bad Program Recoverer', which should get the program back.

You then just replace the REM statements with the original lines. What could be simpler?

Now for the Master. It looks as though it's a pretty good computer and has a lot going for it – but the price! Not all of us earn a Wogan-level wage!

Surely Acorn's object is to sell computers, not keep the warehouse people in a job!

I can already hear the question, 'Whatever happened to the British computer industry?' – it's up to you, Acorn!

Simon Kindlen
Clackmannanshire

The utility mentioned is on the *Best of Acorn User* cassette and the *UserROM* chip.

LETTERS

PAGEMAKER MENU

Sir, In your May issue, Tony Quinn reviewed the *Fleet Street Editor* and said it would be interesting to see what others can come up with. I enclose a page which I created on AMX *Pagemaker Plus*.


Hot & Cold Bar Snack Menu.

Ploughmans
Cheddar 1.60 Ham 1.75
Stilton 1.65 Pate 1.65

Salads
Prawn 3.50 Turkey 3.50
Beef 3.00 Ham 3.00
Chicken 3.00 Pate 3.00
Cheese 2.50

Jacket Potatoes
Cheese 1.10 Sausage + Onion 1.10
Prawn 1.80 Cheese + Ham 1.75

Basket Meals
Scampi 2.80 Chicken 2.35
Sausage 1.65
All served with salad garni + chips

Pies All at 2.80
Steak + Kidney Poachers
Chicken, Ham + Mushroom
All served with 2 veg + chips

This was the first piece of work I had done on the system. As you can see from the results, it must be pretty easy to use! I work in a public house and the restaurant needed a new menu, so I decided to put my new toy to the test. Not bad for a first go!

S M Seymour
Hampshire

A CHEAP BEEB

Sir, I am a keen reader of your fine publication. I own an Electron but am eager now to enhance my computing ability. I feel this can best be achieved with a BBC model B computer rather than expensively and inconveniently upgrading my Electron. However, I am not keen to lay out £399 for a new model B, the design being four years old at least. Thus I am looking for a second-hand Beeb. In April's issue of *Acorn User* The Comp Shop second-hand dealer was mentioned. Would it be possible to supply me with a list of other shops which deal in second-hand Beebs?

Anthony Poole
London

We don't know of any others. You could try nearby dealers and our free ad pages.

We'd like to hear from other companies who do BBC micro trade-ins.

A DISC WITH A HOLE

Sir, I've heard about dual discs which can be turned over, but as I've not been able to find where to buy them, I've made them with the help of a pair of scissors and a hole punch.

Although this method doesn't work on all discs, it does on most. You cut a slit opposite the protection slot and a hole in the disc, again opposite the hole on the right – when you've turned it over, it looks the same as the front. Then all you have to do is format it.

Don't do it on your favourite disc, though – do it on a disc you don't mind losing.

Matthew Rooke
Surrey

This does seem to work, but disc manufacturers don't approve of it, and you should not put anything valuable on these discs, just in case. Incidentally, you can buy a special 'disc nibbler' to do the job.

YOU CAN DO BETTER

Sir, Talk about passing the buck! In the June issue of *AU*, you published a letter from a reader who asked that you include more control projects (lightpen, robot arm, and so on).

Frankly I wonder why you bothered to include his letter when you fobbed him off with such a pathetic reply! Just because other magazines include such items, you seem to feel that *AU* therefore doesn't have to. If you carry your argument to its logical conclusion, then why do you carry program listings? After all, other magazines make a fair job of it, so why should you bother?

The fact is I (and presumably others) don't want to rummage through unfamiliar electronics magazines on the off-chance there may be something of interest.

I would like to see articles on the construction of hardware with appropriate supporting software, to the standard synonymous with *Acorn User*.

Geoff Preston
Head of Computer Studies
Friern Barnet County School
London

MORE ABOUT SUPER ART

Sir, The AMX *Super Art* saga continues. After having discovered how to convert mode 1 screens (see Letters, July) several things occurred to me about the creation of *Super Art* files.

As your readers may know, when using *Super Art* it is first necessary to create a blank picture file before drawing can begin. This process takes several minutes and is rather tedious.

Armed with the information you published in July, I set about devising a quick way to create full screen picture files. The program below simply loads in a blank screen and resaves it several times over, each time with a different suffix. The result is that in a very short time you will have created five blank screen files which can be used in *Super Art*.

```
10 MODE 1
20 GCOL0,131
30 CLG
40 FOR N=1 to 5
50 N$=STR$(N)
60 file$="FILE"+N$
70 OSCLI("SAVE "+file$+" 3000+500 2820 20F")
80 NEXT
```

Incidentally, I usually insert a few lines in the program to draw a line just inside the border of the screen. This provides a guide as to whether or not I have reached the edge of the picture when scrolling in and out of the screen window.

Don't forget that it is still necessary to use the Open and Close File options while using the program.

I am happy to report that I am now making much greater use of *Super Art*: I hope this proves helpful to other users.

Jonathan Inglis
London

Our thanks to Darren Skirrow of Barnsley, Bob Potter of Bath, P V Lewis of Swansea, Richard Connolly of Befordshire, Murray Elliot of Kirkcaldy and Mark Boyce of Waltham Abbey for writing into help Jonathan with *Super Art*.

Colin Foster of Ilford also had a solution and added, 'AMX seems to have slipped up on its Epson RX/FX/LX screen dump provided as a library function. Under normal circumstances it reproduces yellow darker than red!

As I'm nit-picking, I wonder if anyone else has succeeded in making use of their USER functions. The manual offers very little help so I presume that these are for future expansion by AMX – it took me absolutely ages to get my own function in there.'

WHAT TO DO WITH THE WAND?

Sir, I've got the wand in *Castle Quest*, but what do I do with it now? I've tried everything!

Thanks for the help in *Twin Kingdom Valley!*

Andy W
Liverpool

LETTERS

THE WAND IS AT HAND

Sir, In answer to Jimmy Liu's plea in the June issue, here's how to get the wand from the witch in *Castle Quest*.

1. Get the bucket from near the aqualung by jumping from the pillar to the left, pressing 'P' when you go over it. You must be holding the aqualung.
2. While holding the aqualung place the red line under the bucket, stand in the water and press 'D' 'R' 'S' 'P' in that order. This fills the bucket with water.
3. Make your way to the witch's area via the spiders.
4. When you hear the witch approaching, stop, retrieve the bucket and wait until she is about 1cm away then press cursor left to throw the water from the bucket.
5. Go to the ditch which contains the wand and drop the stool (taken from the prison) down.
6. Pick up the wand and throw it up to get it out of the ditch. This allows you to turn.
7. Jump onto the stool, then out of the ditch.

Incidentally, it was my friend's mum who told us that witches are killed by water!

Steve Giller
Derby

Thanks to Andy W from Liverpool and Benedict Currie from Middlesex who also sent in the answer to Jimmy's plea.

SOFTWARE FOR ECONET

Sir, I am writing to seek correspondence from readers in the UK with similar interests.

I am a teacher in a college in the New England region of New South Wales, Australia. I am responsible for the running of a 15-station level three Econet which accesses a 50Mb hard disc. We use the machines to teach computer literacy to boys in year 9, and to assist in the learning process by use of simulations, etc.

The problems that I have faced in the past, those of inadequate supply of relevant and decent software (especially for Econet), have been somewhat ameliorated over the last year or so, but I still find supply difficult.

It is also difficult to know whether a particular software package is going to be everything that the reviewer says it is.

For these and other reasons, I would like to correspond with teachers interested in computing, of whatever discipline, in the UK and Europe, by either conventional or electronic mail.

I can be contacted via Telecom Gold on the following address: 07:MGL001.

Martin Levins
Armidale, Australia

SPORTS WON'T SPEAK

Sir, I would think it a worthwhile idea if you would point out that *Hypersports* by Imagine does not work if the host machine has an Acorn speech system fitted.

The first event, swimming, works perfectly, but when you pass on to clay pigeon shooting, the computer will not respond to any keypresses and therefore you can't shoot a single bird.

I, like many others, would have assumed that this was an error in the program itself, as opposed to an error in the machine but I had read of similar clashes, ie, features in certain programs never occur, in a previous edition of *AU*.

Desparate, I removed the speech chips and the program now works. This process is, of course, not recommended if you have little knowledge or experience of extracting chips. Some owners of the speech system could be left rather frustrated with a game they can't use. Surely compatibility checks with the speech system have become standard procedure for software companies? With *Hypersports* being as popular as it is, speech system owners are bound to be among those who buy the game.

That said, may I congratulate you, *Acorn User*, on publishing the best quality, totally unrivalled magazine for the Beeb.

A Whitney
Essex

STARTING THE QUEST

Sir, From what I have heard *Castle Quest* sounds a good game, but I cannot get past the troll on the right and the spider on the left.

Please can someone tell me at least how to get started?

Alex Atkin
London

Latest round-up of games high scores

Aviator	Acornsoft	30,450	**P Hopgood***
Android Attack	Computer Concepts	1,495,105	**Tim Hedger***
Arcadians	Acornsoft	98,020	**Niaz Islam***
Battletank	Superior	108,500	**Stephen Corcoran***
Castle Quest	Superior	2,240	**Peter Simpson***
Chukkie Egg	A&F	30,275,420	**Stephen Corcoran***
Crazy Painter	Acornsoft	279,790	**Richard Arundale***
Cybertron Mission	Micro Power	715,960	**Niaz Islam***
Fortress	Pace	129,250	**Stephen Corcoran***
Frak!	Aardvark	20,000,200	**Paul O'Malley***
Free Fall	Acornsoft	5,024	**Philip Comber***
Hopper	Acornsoft	52,422	**John Durrans***
JCB Digger	Acornsoft	131,450	**Stephen Corcoran***
Killer Gorilla	Micro Power	836,475	**Stephen Corcoran***
Match Day	Ocean	10-0	**Matthew Pedeaux***
Meteors	Acornsoft	498,500	**P Ludgate***
Missile Control	Gemini	469,225	**Ian Boffin***
Monsters	Acornsoft	283,000	**Stephen Corcoran***
Mr Ee	Micro Power	1,012,950	**Stewart Roberts**
Moonraider	Micro Power	642,125	**Stephen Corcoran***
Overdrive (BBC)	Superior	338,450	**David Perry***
Overdrive (Electron)	Superior	1,011,720	**P Ludgate***
Painter	A&F	203,690	**Nigel Shaw***
Pengo	Watford	300,400	**Stewart Roberts***
Planetoids	Acornsoft	3,186,450	**Stephen Corcoran***
Pole Position	Atari	384,250	**Niaz Islam***
Rocket Raid	Acornsoft	161,460	**Roger Austin***
Snapper (BBC)	Acornsoft	1,839,210	**Peter Simpson***
Space Adventure	Virgin	4,890	**Mark Bradshaw***
Starship Command	Acornsoft	8,420	**Ian Boffin***
Way of the Exploding Fist	Melbourne House	397,100	**C Parsons**
Zalaga	Aardvark	23,460,500	**Ian Boffin***

**Scores unbeaten since May 1986*

Please say whether your score was notched up on a BBC micro or Electron when sending in your games high scores as in future issues we hope to be publishing separate tables for each micro.

HINTS & TIPS

Martin Phillips, with help from our readers, develops a standard set of printer codes to help new users master their micros

CONTROLLING THE CURSOR

The BBC micro and Electron user guides give very little information about the screen cursor, apart from telling you how to switch it on and off. The *Advanced User Guide* mentions that the cursor effect can also be changed, but is rather difficult to follow, and seems to have incorrect values. It is worth looking at, though, as many programs could be improved by using a different cursor style.

There are two ways of turning the cursor off with the BBC micro, and although one is not in the Electron manual, both appear to work just as well on the Electron. The one given in both user guides is:

Cursor off: VDU23,1,0;0;0;0;

Cursor on: VDU23,1,1;0;0;0;

The BBC micro user guide also states that the cursor can be switched off another way:

Cursor off: VDU23,8202;0;0;0;

Note that when editing, this command inverts the colour of the character to be copied. However, it does have more uses. It is more robust than the former command, whose effect is cancelled by using VDU4 in graphics modes. If you are writing a program which needs the text and graphics cursors to be joined and separated repeatedly (VDU5 and VDU4), then the latter method for switching the cursor off is the better one, as it only needs to be used once in the program (unless the mode is changed). There is a problem with using this method, though, as switching the cursor on again is not straightforward. The following command:

Cursor on: VDU23;29194;0;0;0;

will work but only in mode 7. If we look in more detail at why this is, we can gain an insight into how the cursor can be modified to suit one's own requirements.

To understand how the VDU23;8202;0;0;0; command works it helps to remove the semi-colons. A semi-colon is used to denote a two-byte number, ie, 0; is the same as 0,0.

The two-byte number for any pair of single byte numbers in a VDU statement is derived in the following way:

Two-byte number = (first single byte number) + (second single byte number times 256) (NB: there is a semi-colon at the end of the command – this is missing off some versions of the BBC user guide and causes some very odd effects later in a program if other VDU commands are used.)

Using this formula to remove the semi-colons we get the following single-byte equivalent:

VDU23,0,10,32,0,0,0,0,0,0

ie, 10 + (32*256) = 8202

VDU23 is normally used to reprogram a character but VDU23,0 . . . has an entirely different function; it is used to reprogram the 6845 Cathode Ray Tube Controller (CRTC) chip registers. (This chip is not present in the Electron, but the operating system is still able to cope with it.) The first number following the zero specifies the register within the CRTC, and the second number following the zero is the data to be written into the register specified. The remaining six bytes are all zero and are used to pad out the command to the nine bytes the VDU23 command expects.

This command, therefore, reprograms register 10 with the value 32 (register 10 is the cursor start register). Each character is made up of several scan lines – this refers to the beam scan for the cathode ray tube. Using this register we can control which vertical scan line we will start at. The topmost line is 0.

To see how this affects the cursor, we need to know the bit functions of register 10. These are as follows:

Bit 7 (value 128)	unused
Bit 6 (value 64)	blink on or off (0 = off)
Bit 5 (value 32)	blink rate (inset gives fast flash, set gives a slow flash)
Bit 4-0	cursor start line

From this we can see that the VDU23,0,10,32,0,0,0,0,0,0 command has set bit 5 of register 10 only. The cursor can be turned on again by setting bit 6. This, however, gives a full character cursor, so we must use the lower 5 bits to select the cursor start line. The cursor start needs setting to the same as the cursor end, which is where the problem lies, as there are different numbers of scan lines per character row for different modes:

Mode 0	8
Mode 1	8
Mode 2	8
Mode 3	10
Mode 4	8
Mode 5	8
Mode 6	10
Mode 7	20

For a single-line cursor, it is necessary, therefore, to program register 10 with:

Bit 6	64
Bit 5	32
Bit 4-0	1 less than the number above (2 in the case of mode 7)

This now gives the following commands to switch the cursor back on again:

Mode 7	VDU23,0,10,114,0,0,0,0,0,0 VDU23;29194;0;0;0;
Modes 3, 6	VDU23,0,10,105,0,0,0,0,0,0 VDU23;26890;0;0;0;
Modes 0,1,2,4,5	VDU23,0,10,103,0,0,0,0,0,0 VDU23;26378;0;0;0;

To examine how the size of the cursor can be changed, listing 1 on the yellow pages allows various cursors to be displayed, and also allows the flash rate to be changed. Setting register 10 to 0 will give the largest cursor, and the highest number in the range will turn the cursor off. It is also possible to change the cursor and register which is register 11. Make the following changes to listing 1 to see the effect of this.

```
285 VDU23,0,10,rate,0;0;0;0;
290 VDU23,0,11,start,0;0;0;0;
```

This gives a full cursor and allows the height to be reduced from the bottom up.

DOUBLE YOUR INPUT

Several readers have asked for routines to input a question and print the answer and for both of these to be in double height characters. It would seem to be an easy task; that is until you try it. The double height lettering facility in mode 7 requires the use of the teletext character code 141. To get the double height lettering to work correctly it's necessary to print the control code 141 followed by the lettering on each of two successive lines. Type in the following line and run it to see the effect:

```
10 PRINT CHR$(141) "Hello"
```

It prints out only the top half of the word. To print out the whole word, the same line must be entered again:

```
20 PRINT CHR$(141) "Hello"
```

Now when the program is run, the word "Hello" in double height is printed, and not as two top halves of the word as one would expect. Once the control code has been written into a line (a blank space will appear on the screen where the code resides), the rest of the

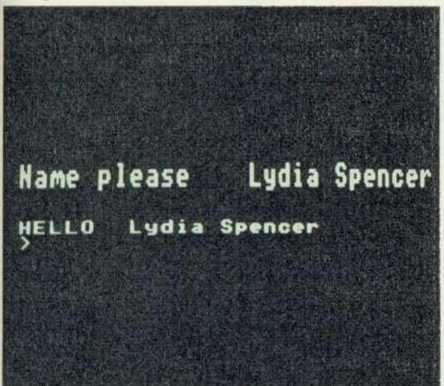
line will appear in double height lettering, so it would seem possible to program in a double height INPUT statement.

10 MODE 7
20 PRINTCHR$141;: INPUT "Name please "name$
30 PRINTCHR$141;: INPUT "Name please "name$

It does not work, though, as one would hope. The program prints out the top half of "Name please", and prints out the top half of the name as it is entered in. Once the name has been entered in, the program goes to line 30, printing out the bottom half of "Name please", and waiting again for a name to be entered. The following attempt also suffers from the same problem:

10 MODE 7
20 PRINTCHR$141; "Name please"
30 PRINTCHR$141;: INPUT "Name please "name$

The problem occurs in the use of the INPUT



Inputting double-height text in mode 4

statement, so to avoid this, we can use the GET statement instead. This statement is used to input a simple numeric variable, or if GET$ is used, a string variable. The following illustrates its operation:

A$=GET$: PRINT A$

Notice that unlike the INPUT statement, the GET$ statement does not print out the letter as it is keyed in. This has to be done using a PRINT statement, and can then be printed in double height. To input a whole string of letters, a loop has to be made with a test to see if Return has been used to indicate the end of the string. Listing 2 on the yellow pages shows one way the routine could be made to work (the three parameters following the PROCdouble statement give the string to be printed, the horizontal and the vertical positions at which to place the print). The input routine will take care of the Delete key, though if it's pressed too much, it will also remove the prompt! Notice that the question is put into the string 'ask$', which is preceded by the green teletext colour code, CHR$(130), and followed by the magenta colour code, CHR$(133). This listing is all very well for BBC micro owners, but I have not forgotten the many readers with Electrons. Listing 3 gives a routine to work in modes 0, 1, 2, 4 and 5. This listing is rather more complicated, partly because of the special double height procedure, and partly because the Delete key (which has code 127), needs special treatment.

An odd effect was found when trying the procedure. If the following is attempted:

LEFT$(name$,0)

a character is returned with the ASCII value of -1! This printed an odd character on the screen if the condition was met, which happened if the first character was deleted – hence the need for the elaborate PROCdelete procedure. Another problem occurred when the Return key was pressed: a dot pattern at the end of the input line was produced, which also had to be filtered out. The Return key has an ASCII value of 13.

The routine filters out all the control codes below 32 to stop any odd effects if someone should try to crash it.

Having a timed input is easy to implement. At the start of the program (say at line 125) insert a line to set TIME to 0. Then instead of checking to see if the Return key has been pressed at the UNTIL . . . line (line 180), this line can check for an elapsed time. For example, to check for a time delay of 10 seconds the following would need to be inserted in place of the test for the Return key:

180 UNTIL TIME >1000

TIME counts in centiseconds, ie, hundredths of a second.

CRACKING THE CODES

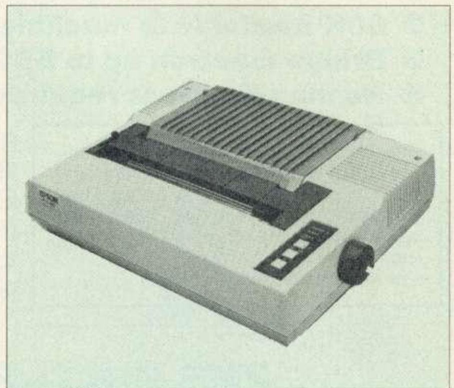


Epson LX80

In January's Hints and Tips I asked for help to produce a standard set of printer codes for a (hopefully) wide range of printers.

The response was tremendous, and my thanks go to all those readers who wrote in. Also the number of letters received gives a good indication of just how much of a problem printer codes are.

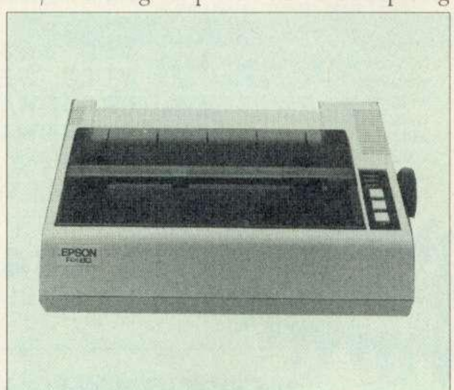
I worked through all the sets of commands for the printers I have received information



Epson FX80

from readers, and picked out those which are the most useful.

I then prepared a comparison chart (see page 63) for each printer, so you can see at a glance which codes are standard and which are not. The standard line spacing is 1/6". The use of 1/72" sizes is important, as this is the size of an individual dot. Thus using all nine pins of the printer would give a line height of 9/72" which is 1/8". Setting the printer size to this spacing



Epson RX80

produces lines of text where there is no space between each line.

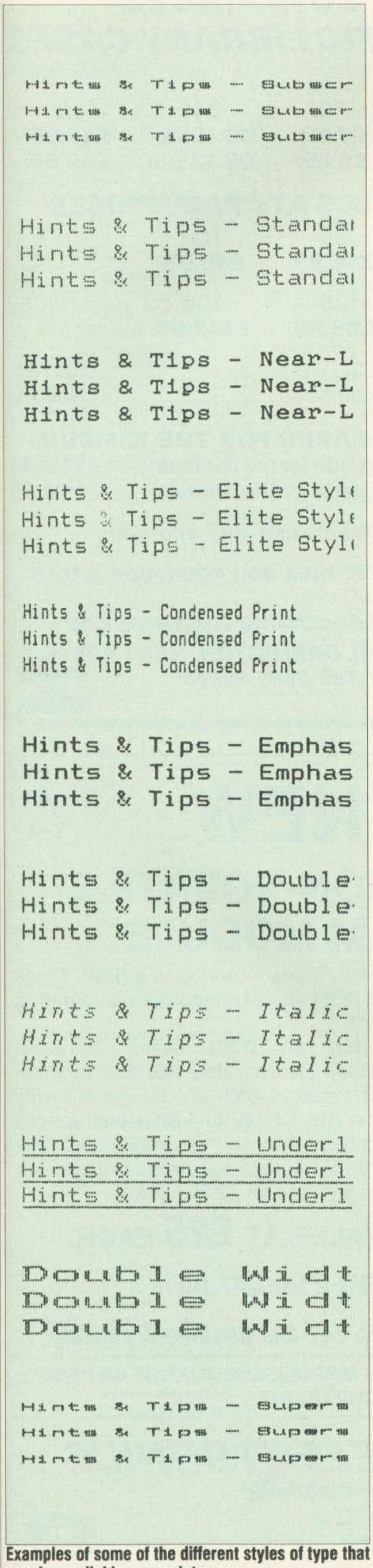
There are some problems with producing a chart such as this:

1. Some codes respond in different ways on different machines. Combinations of codes vary in their effects. For instance, on the Epson LX80 it is not possible to have condensed NLQ, whereas on the Citizen 120D it is, and this cannot be shown on the chart. Another example concerns the justify command, which is available on all print fonts of the Citizen, but only on the LX80 NLQ font.

2. The codes selected are those which I believe are the most useful. I have not included such things as TAB codes, for instance, as these are



HINTS & TIPS



Hints & Tips - Subscr
Hints & Tips - Subscr
Hints & Tips - Subscr

Hints & Tips - Standa
Hints & Tips - Standa
Hints & Tips - Standa

Hints & Tips - Near-L
Hints & Tips - Near-L
Hints & Tips - Near-L

Hints & Tips - Elite Styl
Hints & Tips - Elite Styl
Hints & Tips - Elite Styl

Hints & Tips - Condensed Print
Hints & Tips - Condensed Print
Hints & Tips - Condensed Print

Hints & Tips - Emphas
Hints & Tips - Emphas
Hints & Tips - Emphas

Hints & Tips - Double
Hints & Tips - Double
Hints & Tips - Double

Hints & Tips - Italic
Hints & Tips - Italic
Hints & Tips - Italic

Hints & Tips - Underl
Hints & Tips - Underl
Hints & Tips - Underl

Double Widt
Double Widt
Double Widt

Hints & Tips - Supers
Hints & Tips - Supers
Hints & Tips - Supers

Examples of some of the different styles of type that may be available on a printer



Brother M-1109

usually handled by a program or a wordprocessor, without involving the printer tab settings.

3. Some new codes are only available on the latest printers and tend not to be standard. Those which are especially useful have been included here, for example, double height, justify, and reverse print (white text on a black background).

4. I have called 'expanded print' double width print (which is what it is) to differentiate it from double height print.

5. Proportional spacing should more correctly be called proportional print, as it is the print which is spaced in proportion to the size of each letter. The Citizen 120D also offers true

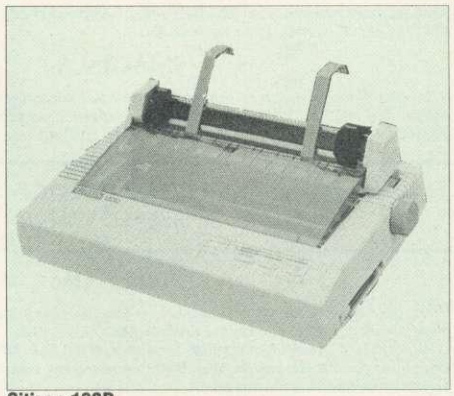


Centronics GLPII

proportional spacing where the length of the space between words can be varied. This facility has not been included on the chart, as the printer's justify command does this automatically and is the more obvious command to call into action.

The first 10 printers have been included here. Next month I shall include more, and show how some of the graphics commands can be tested and used, and how to program your own screen dump. Many readers have requested an article on this.

My thanks to the following readers for sending in information about their printers: K E Shields, Alnwick; Kevin Palmer, High Wycombe; B R Grimshaw, Topsham; Clifford Grimason, Portadown; Gordon Russell, Welwyn; J B Green, Potters Bar; Alan Downes, Gravesend; A S Cartwright, Leeds; W A Winslade, Dorset; R A Eadie, Bedford; Michael Green, Sidmouth; Chris Wedge, Folkestone; Brian Moss, Durham; T C Willis, Edinburgh; M J Jones, Bradford; Michael Lowe, Loughton; S Briggs, Manchester; J K Scott, London; John Clarke, Lowestoft; H A Richardson, Leicester; S Turner, Bristol; P Normington, Worth; J Sutcliffe, Southport;



Citizen 120D

Roy McNamara, Johannesburg; P Christie, Hythe; B Corksedge, Lincoln; R P Drew, Bristol; H Johnson, London; Leslie Gardener, Farnham.

SUCCINCT SUGGESTIONS

If you want to do something odd to the mode 7 cursor try:

VDU23;4872;0;0;0;

To convert hexadecimal (hex) to decimal type:

PRINT &20 (Prints decimal equivalent of 20, ie, 32).

To convert decimal to hex type:

PRINT~ 20 (Prints hex equivalent of 20, ie, 14).

If typing in a listing which makes frequent use of meaningful, but long, variable names, program them first into the function keys. This can save a lot of time if the variable names are in lower-case.

Don't use VDU22 to change the screen mode. It does not do exactly the same as the MODE statement and can cause problems, although it can be used in procedures whereas MODE cannot.

Problems with errors? The last error can be found by typing REPORT, and the error line number can be found by typing PRINT ERL.

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8	Backspace	●	●	●	●	●	●		●	●	●
12	Form feed (new page)	●	●	●	●	●	●	●	●	●	●
13	Carriage return	●	●	●	●	●	●	●	●	●	●
14	Double width, 1 line only	●	●	●	●	●	●	●	●	●	●
20	Cancel double width, 1 line only	●	●	●	●	●	●	●	●	●	●
15	Condensed mode	●	●	●	●	●	●	●	●	●	●
18	Cancel condensed mode	●	●	●	●	●	●	●	●	●	●
27,45,1	Underline mode	●	●	●	●	●	●	●	●	●	
27,45,0	Cancel underline	●	●	●	●	●	●	●	●	●	
27,48	Spacing 1/8"	●	●	●	●	●	●	●	●	●	●[7]
27,49	Spacing 7/72"	●	●	●	●	●	●	●	●	●	
27,50	Spacing 1/6"	●	●	●	●	●	●	●	●	●	●
27,52	Italics		●	●	●	●	●	27,82,19	●	●	
27,53	Cancel italics		●	●	●	●	●	27,82,13	●	●	
27,56	End of paper detect off	●	●	●	●	●	●	●	●	●	●
27,57	End of paper detect on	●	●	●	●	●	●	●	●	●	●
27,64	Initialise printer (reset)	●	●	●	●	●	●		●	●	
27,69	Emphasised printing	●	●	●	●	●	●	●	●	●	●
27,70	Cancel emphasised printing	●	●	●	●	●	●	●	●	●	●
27,71	Double-strike mode setting	●	●	●	●	●	●	●	●	●	
27,72	Cancel double-strike mode	●	●	●	●	●	●	●	●	●	
27,77	Elite mode		●	●	●	●	●			●	●
27,78,n	Skip-over perforation setting	●	●	●	●	●	●	●	●	●	
27,79	Cancel skip-over	●	●	●	●	●	●	●	●	●	
27,80	Pica mode		●	●	●	●	●			●	27,18
27,82,x	Int. character set English x=	3	3	3	3	3	3,11[2]			●[4]	
	Int. character set American x=	0	0	0	0	0	0				
27,83,0	Superscript on	●	●	●	●	●	●	●	●	●	●
27,84	Superscript off	●	●	●	●	●	●	●	●	●	●
27,83,1	Subscript on	●	●	●	●	●	●	●	●	●	●
27,84	Subscript off	●	●	●	●	●	●	●	●	●	●
27,87,1	Double width	●	●	●	●	●	●	●	●	●	●
27,87,0	Cancel double width	●	●	●	●	●	●	●	●	●	●
27,97,n	Justify text (n=0-3)				●[1]	●					
27,104	Set double height					●					
27,117	Cancel double height					●					
27,106,n	Reverse feed n/216"			●							
27,112,1	Proportional print			●		●	●			●	
27,112,0	Proportional print cancel			●		●	●			●	
27,114	Reverse print on					●					
27,116	Reverse print off					●					
27,120,1	Near letter quality on				●	●	●	●			
27,120,0	Near letter quality off				●	●	●	●			
Graphics commands:											
27,65,n	Line spacing n/72"	●	●	●	●	●	●	●[5]	●	●	●[6]
27,75	Normal density bit image mode	●	●	●	●	●	●	●	●	●	●
27,76	Dual density bit image mode	●	●	●	●	●	●	●	●	●	●
27,89	Double density bit image mode		●	●	●	●	●	●	●	●	
27,90	Quad density bit image mode		●	●	●	●	●	●		●	
27,42,n	Select bit image mode			n=0-6[3]	n=0-6[3]	n=0-7[3]	n=0-7[3]			●[4]	

Notes: [1] *Available in NLQ mode only.* [2] *x=11 allows £ to correspond to keyboard value, ie, 96.* [3] *Setting n=5 gives 1:1 print.* [4] *No more data available.* [5] *Needs code 27,50 first.* [6] *Sets line space to n/36".* [6] *Spacing 1/9".* ● *Compatibility.*

FIRST BYTE

MACHINE CODE MADE EASY

In the first of two articles on machine code programming, assembly language is explained and explored

Tessie Revivis

There's been a mystique built up over the years about machine code programming – it's difficult, it's only for the experts, you need to be an expert in Basic before you can even think of touching it and so on.

Well, the answer to that can be summed up in a single word – poppycock!

Machine code programming is not difficult, machine code programming is not only for the experts, and you certainly don't have to be an expert in Basic first. To prove the point, enter listing 1 on the yellow pages, save the program (call it "BANNER") and run it. Now isn't that spectacular?! I'm not going to tell you what it is – you enter it and find out!

The program is obviously written in Basic and consists of a series of numbers in DATA statements, though as you might have guessed, those items of data are a machine code program. Machine code is simply a series of numbers, each number representing a specific operation which the microprocessor chip within your computer performs on receipt of that number. The microprocessor, sometimes called an MPU or CPU (Micro or Central Processing Unit), co-ordinates all the actions within the computer – there are various types but the one in the Electron, Beeb or Master is a 6502 or 6512 chip. There's no real difference between the two, the 6512 simply being slightly more efficient than the 6502.

Remembering numbers is difficult at the best of times and remembering a particular action for a particular number is almost impossible, particularly when there are 152 of them (there are 152 instructions in the 6502). So, to help make programming in machine code acceptable, assembly language was invented – each machine code operation is represented by a mnemonic. For example, the assembler instruction LDA means LoaD Accumulator, and the instruction STA means STore Accumulator. The mnemonic chosen is related very closely to the action required and so makes assembly language (or assembler for short) very easy to learn.

After an assembler program has been written it can be run in the usual way, at which time

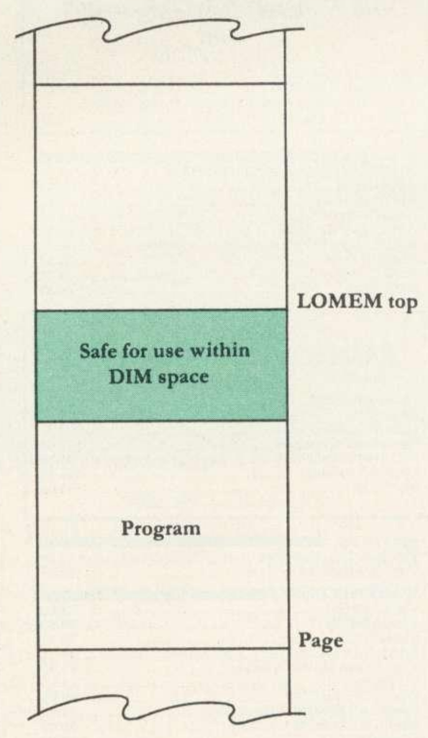


Figure 1. Position of reserved space in memory

Basic will convert the assembler mnemonics into machine code.

This process does not affect the assembler program in any way – it remains in the computer. The machine code generated by the program must be assembled somewhere in the computer's memory – the exact position being defined by the Basic variable P%.

You must be careful where you point P% to – if you're not, it's quite conceivable that you could ruin your program. For general programs it is best to reserve space with the DIM command. For example, the line:

20 DIM code% 50

would reserve 50 bytes of memory above our assembler program, as illustrated in figure 1. Note that the array we have DIMed does not use any brackets. This is because an array usually reserves four bytes per array element to allow large numbers to be stored and by committing the brackets from the number we define only single byte elements. To set P% to the start of this reserved block of memory we use a simple assignment:

30 P% = code

To tell Basic that it's about to enter an assembler program, use the open square bracket, thus:

40 [

Similarly, to tell Basic that the assembly language program is finished, use a closed square bracket, thus:

100]

The above lines are fundamental to all assembler programs – if you like, we have almost defined a standard starting point when it comes to writing assembler.

Let's try writing a small program – to print the letters A through to Z. It's always good practice to try writing the program in Basic first as this shows the main steps which will be needed – silly as it may sound, most software houses write their programs in Basic first as it allows them to change things easily during the development stage. When they've finished writing the program they code it in assembler (to generate machine code) to give the increase in speed which is normally required.

Our Basic program might look like this:

```
10 REM Print A to Z
20 FOR A% = ASC("A") TO ASC ("Z")
30 PRINT A%;
40 NEXT A%
```

What we need to do is to evaluate what the steps were:

- Set a variable to count from "A" to "Z"
- Get the current variable's ASCII code
- Print the character
- Repeat the loop until it's all done

Now to tackle each step in turn. The 6502/12 CPU has three general-purpose registers – you can think of a register being a special location within the CPU which can contain a number in the range 0 to 255 inclusive. The registers are called the accumulator, the X register and the Y register (if it helps, think of these registers as being the Basic variables A%, X% and Y%). Of these three registers the accumulator is by far the most important, although it does not

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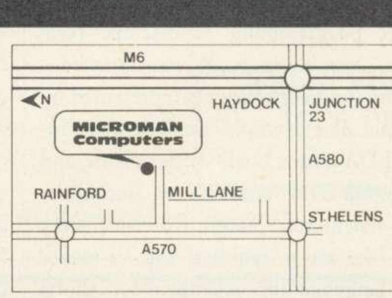
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have any mnemonics or operations associated with it which can be used arithmetically. So why is that important to us at the moment? Well, we want to be able to count from 'A' to 'Z' and as we need to print each character in turn we need to be able to count up in steps of 1, ie, 'A'+1='B', 'B'+1='C', all the way to 'Z'. It's not a major problem, though, as both the Y and X registers have instructions which will add 1 to their contents (INY [INcrement Y] and INX [INcrement X]) so we can use one of these.

The first part of our assembler program, therefore, looks like this:

```
10 REM A to Z in Assembler
20 DIM code% 50
30 P%=code
40 [
50 .start
60 LDY #ASC ("A")
70 .loop
```

Line 50 defines a label, a label being a name like a variable but preceded by a full stop. When the program is assembled the address assigned to the first machine code instruction will be assigned to the label 'start' – this will be used when the machine code is executed by calling it with the command:

CALL start

The instruction in line 60 loads our counter (the Y register) with the ASCII code for the letter A. Line 70 is another label which we'll come back to.

In machine code, characters can be printed to the screen by using an operating system call called OSWRCH (Operating System WRite CHaracter). Details of this and other OS calls can be found in the user guide.

The OSWRCH routine requires that the ASCII value of the character to be printed sits in the accumulator. We must therefore move the current variable count from Y into the accumulator before calling the OSWRCH routine, and this is done thus:

80 TYA

The mnemonic is Transfer Y to Accumulator (see how easy it is to read the instruction!). The character can then be printed by:

90 JSR &FFEE

&FFEE is the address of the OSWRCH and the instruction JSR stands for Jump Save Return (some people call it Jump Sub Routine). Relating this command to Basic, you can think of it as a GOSUB – subroutines will be looked at in more depth in a future article.

The next step is to increment the Y register and the command is INY (INcrement Y). We now need to test the accumulator to see if the character it just printed was a Z, which is done with the CoMPare instruction, thus:

110 CMP #ASC("Z")

If the accumulator is not equal to ASC"Z", we need to re-do the loop again (the label 'loop' was defined earlier to mark the point where we need to branch back to). The instruction is:

120 BNE loop

Branch if Not Equal to loop!

And that is the main program. However,

```
 10 REM Listing 2
 20 DIM code% 50
 30 P%=code%
 40 [
 50 .start
 60 LDY #ASC("A")
 70 .loop
 80 TYA
 90 JSR &FFEE
100 INY
110 CMP #ASC("Z")
120 BNE loop
130 RTS
140 ]
```

Listing 2. Prints the letters A to Z

when the Z has been printed the BNE will not be performed so we then need a way of getting back to Basic's prompt. When we call the machine code it is treated as a subroutine by Basic, in a similar manner to the JSR &FFEE above. To end any subroutine call we use the RTS instruction, ReTurn from Subroutine.

Listing 2 shows the completed program. We now need to assemble the program, which is done simply by typing RUN. You should then see a column of numbers not dissimilar to that shown in figure 2, although the right-hand column of addresses may change. To test the program type:

CALL start

and in no time at all you should see the letters A to Z across the screen.

That wasn't so bad, was it? Writing assembly language just requires a little bit of thought and planning with perhaps some research into assembler instructions you may need to use. I'll be dealing with assembler again next month and will explain the function of the column of numbers generated when the program was run just now. In the meantime you might like to try adapting the program to print the numbers 0 to 9; and also to print the characters Z to A (ie, in reverse) – to do that you'll need to know an extra instruction: it's DEY, DEcrement Y.

Looking at figure 2 we can see that the assembly listing has produced several columns of figures. Taking these from left to right we first come across the address column.

Here it starts at 1C9F – all the data produced when running an assembly language program is in hexadecimal so the address is in fact &1C9F. This address may differ when you run the program on your own micro – if so, don't be concerned, it simply means either that you have PAGE at a different value from that on my micro, or you have entered a few more spaces into your assembly program than I have. The first address given is the address at which the machine code starts, this address is assigned to the label start. We used the command CALL start here – try typing CALL &xxxx where xxxx is the first address in your listing – it has exactly the same effect. Similarly, typing PRINT ~start should produce the same number.

The next three columns of numbers make-up the machine code generated by the assembler. The first digits we have are A0 and 41, where the number &A0 is the machine code instruction to perform LDY, and the number 41 is the hexadecimal ASCII value of the letter

```
1C9F
1C9F              .start
1C9F  A0 41       LDY #ASC("A")
1CA1              .loop
1CA1  98          TYA
1CA2  20 EE FF    JSR &FFEE
1CA5  C8          INY
1CA6  C9 5A       CMP #ASC("Z")
1CA8  D0 F7       BNE loop
1CAA  60          RTS
```

Figure 2. Assembling machine code

A. The machine code instruction is normally referred to as the opcode (short for operation code) while the data it acts on is known as the operand.

Looking at the next line down we can see that the TYA command has only one number across the set of columns – this is because it is an instruction that does not require any data to work on and as such it has only an opcode. The next row down, however, shows three numbers: an opcode and two operands which form the address (&FFEE).

Finally, the third column contains the mnemonics – typed in as the assembly program listing itself – which enable us to read the assembly data listing that was generated by running the program.

For where to find First Byte listing 1 see the yellow pages index on page 121

Next month Tessie Revivis will continue her teach-in on assembly language and machine code

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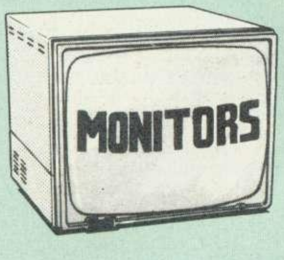
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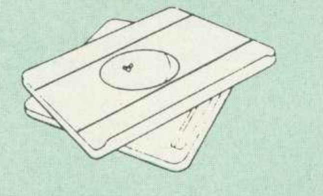
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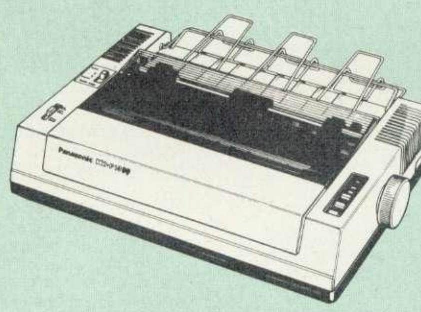
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- *Complete Disc Interface Kit incl. DFS ROM & fitting instructions* **£54**
- *Acorn's 0.90 DFS Kit complete* **£52**
- *DFS Manual (Comprehensive)* (no VAT) **£6.95**
  (P.S. Our comprehensive DFS Manual covers both Acorn & Watford DFSs)
- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17** ● *ADFS ROM only* **£25**
- *Watford's DFS is exclusively available from Watford Electronics. Every ROM carries a special label with our LOGO and serial number.*

WATFORD's DOUBLE DENSITY DFS INTERFACE

The DDFS from Watford Electronics represents a new standard in DFSs for the BBC micro. This is a double density version of our popular single density DFS, and combines all the features of this powerful DFS with the advantages of a system that gives 80% more storage per disc in double density mode. P.S. – Please note that not all DDFSs are capable of providing either the full 80% storage increase, or of allowing a file the full size of the disc – Ours allows both of these! Operates both in Single & Double Density modes.

The typical piece of games software these days is provided upon a protected disc. In order to work on any double density system (including the others on the market) a protected piece of software needs to make calls through the OSWORD &7F routines. To ensure compatibility, the Watford DDFS features probably the most comprehensive and powerful 8271 emulation ever written for a double density system.

PRICES

- *Complete DDFS Kit incl. fitting instructions* **£46**
- *DDFS Manual* (no VAT) **£6.95**
- *We will exchange your existing Single Density DFS Kit for our DDFS Unit at* **£35**

Watford Electronics DDFS PLUS for the BBC B Plus

Watford Electronics was the first company to produce a serious alternative Disc Filing System (DFS) for the standard BBC micro. Since then, we have been refining and advancing this sophisticated product right up to today.
Now WE'VE DONE IT AGAIN; Watford proudly presents the Double Density Disc filing system for the BBC B+, with all the advantages of the advanced Watford DDFS available on the new BBC B+ DDFS.
Acting as a powerful alternative DFS to Acorn's '1770 DFS' supplied with the BBC+, this superb addition to any BBC+ greatly enhances it's performance with a simple fitting operation.

DDFS PLUS incorporates all the features of the Watford's popular DFS & DDFS for the BBC B, (at the same time retaining full compatibility with Acorn DFSs), plus it has the following extra features:

Automatic density selection – Full single and double density operations – Extremely powerful and comprehensive OSWORD &7F emulation – Any file can be full size of disc – Density of last access assumed for speed – Automatic 40/80 stepping swapped on error – All Acorn's extra disc commands implemented.

As you can see from the above information, Watford's DDFS for the BBC+ is far more sophisticated and well thought out than the standard. Take any disc produced by any Watford DFS from the standard BBC and catalogue straight off with no problems.
Unlike the Acorn 'ADFS', our DDFS+ system is just as easy to use as the standard DFSs, with no new complex concepts to have to learn. The features within our DFSs have been constantly enhanced over a period of three years during the time that they have been released; significant attention has been paid to feedback from our customers so that the features offered are carefully honed to the requirements of hobbyists and serious programmers alike.
The Watford DDFS+ is supplied with a comprehensive DDFS manual that explains the basics of disc drives, DFSs, etc. Priced at only £30 including the manual, the Watford DDFS+ is surely one of THE best buys you could make for your BBC B+!
Join the leaders in BBC peripherals; join Watford Electronics – committed to supporting the BBC micro.

DDFS PLUS (for BBC Plus) **£30**
(Price includes comprehensive manual)

MYSTERIES OF DISC DRIVES & DFS REVEALED

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

For instance, what is the difference between single and double density formats, how can you use a 40 track disc on an 80 track disc drive? What is the difference between a DFS and disc interface kit? Should you acquire a single Disc drive or twin? What does 48 TPI and 96 TPI discs mean? These are just a few of the questions you may have asked yourself and never found the answer or maybe you have yet to encounter these questions.

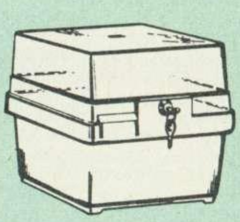
Now the mystery of buying a suitable interface and disc drive for your BBC micro is revealed in Watford's new book entitled 'MYSTERIES of DISC DRIVES & DFS REVEALED'. It describes in fine detail, yet remaining very readable to the beginner, how disc drives operate, the type of interfaces available, which type of discs to use on a disc drive and how data is stored on the discs.

£5.95 (Book No VAT)

DUST COVERS (For our Disc Drives)

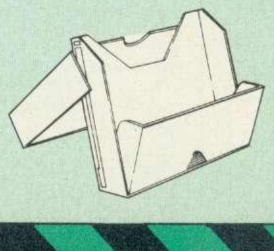
Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

LOCKABLE DISC STORAGE UNITS



Strong plastic case that afford real protection to your discs. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

M35 - holds upto 40 discs **£9**
M85 – holds upto 95 discs **£11**



PLASTIC LIBRARY CASES

FOR 5¼" DISC STORAGE holds 10 Discs. **£2.00**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates the single density capacity. The double density storage capacity is second one, (that within the brackets). All disc Drive type numbers start with the prefix "C".

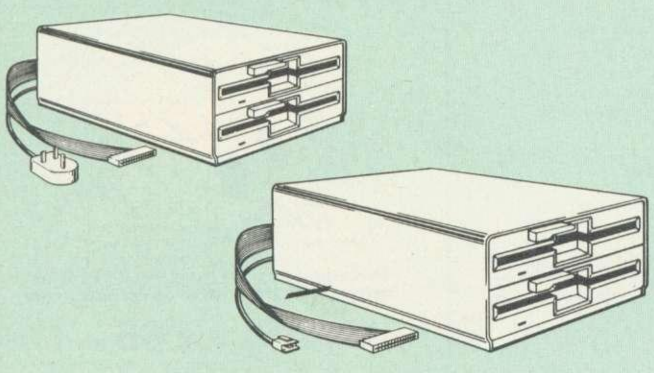
The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). Both are of Japanese manufacture.

With two prices in a box (e.g. £295/£299), the first price is for the standard drive and the second for the same unit in switchable type. Users of either of the two Watford DFSs will not need switchable drives as their DFS will provide software switching for them.

All our Disc Drives (except CLS100) are Double Sided and will operate in both Single and Double Density modes. *Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*
Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality Epson and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate: extensive tests within our workshops have confirmed this. All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. (Ideal for Schools & Colleges. All single disc drives with power supply, (i.e. CS100, CS200 & CS400S) are supplied in a twin case with twin data cable for later inclusion of a second drive). At Watford we anticipate your needs of tomorrow not just today!

When using a BBC Micro, most people find themselves short of space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space; your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. *(Turn to the 12th page of our advert for the Plinths).*



Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
100K (180K)	CLS 100 £95		CS 100 £116	
200K (360K)	CLS 200 £102	CLD200 £185	CS 200 £116	CD200 £199
400K (720K)	CLS 400 £104 / £105 CLS400S	CLD 400 £185	CS400 £123 / £124 CS 400S	CD400 £205
800K (1.44M)		CLD800 £194 / £195 CLD 800S		CD800 £218 / £219 CD 800S

- TWIN Disc Drive Case, complete with Power Supply & Cables **£35**

Securicor carriage on Disc Drives £6

Prefix **C** *= Cased Drive*
L *= Less PSU*
S *= Single*
D *= Double*

Suffix **S** *= 40/80 Switchable*

e.g. CLS400S = Cased drive, Less power supply unit, Single 400K, Switchable (40/80 track).

3M – DISKETTES

Top quality 3M – SCOTCH Diskettes from Watford Electronics (Your 3M Appointed Distributors). All our discs carry a lifetime warranty. These discs are quiet in operation and insert positively with their reinforced hub rings. Boxes of 10 supplied complete with self stick disc labels and write protect tabs.

- *10 × 5¼" S/S D/D 40 Track Diskettes* **£10**
- *10 × 5¼" D/S D/D 40 Track Diskettes* **£12**
- *10 × 5¼" S/S D/D 80 Track Diskettes* **£17**
- *10 × 5¼" D/S D/D 80 Track Diskettes* **£17**

- *10 × 3½" S/S D/D 40/80 track Discs* **£25**
- *10 × 3½" D/D D/D 40/80 track Discs* **£35**

TOP QUALITY 5¼" DISKETTES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs. Each Disc has a reinforced hub ring and carries a lifetime guarantee. These are supplied complete with selfstick labels and packaged in an attractive plastic library disc box to protect them from damage. We strongly recommend these Discs.

DON'T SETTLE FOR LESS, BUY THE BEST

- *10 ×* **M4** *S-S D/D 40 Track Discs* **£9**
- *10 ×* **M5** *D/S D/D 40 Track Discs* **£11**
- *10 ×* **M7** *D/S D/D 80 Track Discs* **£15**

- **3"** *Double Sided Discs* **£4** *each*

Special BULK OFFER on 5¼" DISCS

(Supplied packed in plastic storage Units)
(Lifetime warranty on Discs)

Type	Description	Pack of 20	Pack of 50
M4	Single/Side Double/Density 48TPI	£17	£42
M5	Double/Side Double/Density 48TPI	£21	£56
M7	Double/Side Double/Density 96TPI	£29	£70

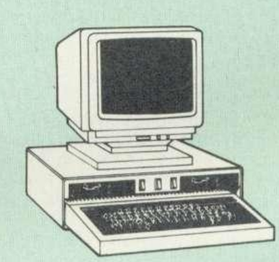
DISC ALBUMS

Attractively finished in antique brown leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

ACORN WINCHESTER DRIVES

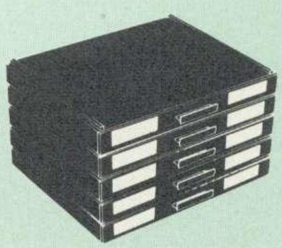
Supplied complete with Level 3 File Server Software.
10 Megabytes **£1050;** 30 Megabytes **£1549**



CDP 800S

Twin 800K Double sided 40/80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The switches are mounted on the front panel for ease of use.

Introductory price: **£239**
(Securicor Carr. £7)



STAK-PAK

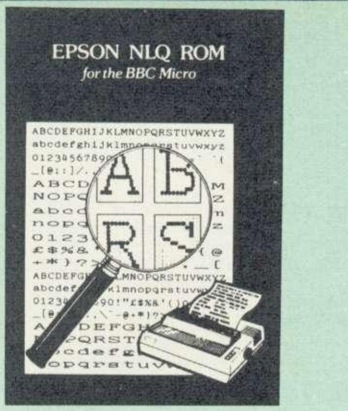
The unique computer program filing and storage system. Made of tough black plastic, these compact drawer sections hold two cassettes each and lock together vertically to form miniature cabinets of any height. Each drawer section has two C12 Data Cassettes with labels plus external index card.

Five twin Packs incl.
10 Cassettes Only: **£6**

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use.

£8



Harness the full potentials of your Epson RX & FX Printers. Impress your friends and business colleagues with the quality of your letters and printed material with Watford's very simple to use EPSON NLQ! (Near Letter Quality) ROM. Suitable for FX80, RX80, RX80F/T, FX100.

Look at the features:
- Simply type *NLQ80/100 and a single VDU code to use NLQ print.
- NLQ is then available without any modifications from BASIC, WORDWISE, VIEW (with NLQ DRIVER) or virtually any other program or language.
- Single codes select PROPORTIONAL type (yes even on the RX80); ENLARGED type; UNDERLINED type. These features can be used seperately or in any combination.
- Full UK character set; Standard 'pica size'; Proportional spacing; Enlarged; Underlined; Normal type.

The NLQ ROM is supplied complete with comprehensive manual.

P.S. NLQ ROM is compatible with the Torch Z80 system and can be used from within the Perfect Writer software.

Only: £25

VIEW PRINTER DRIVER for NLQ ROM

This specially written printer driver has been designed to allow View access to the full features of our NLQ ROM.
A must for all VIEW and NLQ ROM users.

£7.00
(Hi-View compatible)

THE NLQ DESIGNER

KAGA KP810/910 and Canon PW1080 are two superb printers, as our many thousands of satisfied customers would surely attest to. One of it's particularly strong points is the NLQ option that it offers; perhaps one of the more weaker points is the effort required to design your own custom NLQ font.

Well the solution is here NOW in the shape of Watford's NLQ DESIGNER ROM! For the BBC Micro. This powerful piece of software allows easy design and entry of a full NLQ font, with further fonts recallable from disc. Once a font has been programmed with the versatile NLQ DESIGNER, it can be saved to disc, downloaded to your Kaga (or Canon) printer, or even programmed into an EPROM (given the appropriate hardware) and then plugged directly into your printer so that it is available immediately when you turn it on. Downloadable Fonts require 6264 RAM chip fitted. Now BBC Master compatible.

A 40 or 80 track (please specify) disc containing 3 example fonts is included in the package.

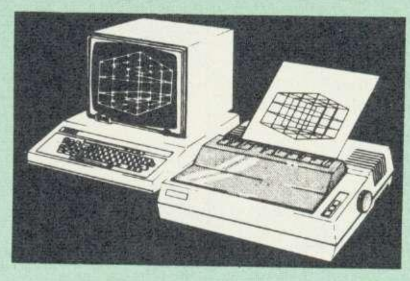
(P.S. This ROM is not suitable for Epson printers.)

- NLQ Designer ROM & FONT Disc **£25**
- Kaga Individual FONT ROMs **£15**

(Write in for further details).

ALL PRICES EXCLUSIVE OF VAT

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including all Mode 7 facilities etc. We have to admit that there is one facility that we cannot replicate – if anyone can supply flashing ink we would like to know!
The ROM also provides window setting utilities and two new OSWORD calls that allow mode 7 graphics pixels to be read and plotted using the standard graphic co-ordinate system. The latest version includes a graphic dump trigger for dumping screens from games whilst they are running.
Two commands are used to operate the dump routines:
*GIMAGE – This provides a full graphics dump of any graphics mode, plus modes 7 and '8'. There are many optional parameters but you need only specify the parameters you wish to change.

Features available include:

- Vertical and horizontal scaling through all the graphic modes and mode 7
- Rotation of the image produced through 90, 180 and 270 degrees
- Left hand indentation setting
- Screen dump window definition
- Colour grey scaling
- Two tone fast dump
- Special colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered dumps
- User port switched dumps

What does the independent press say!

Practical Electronics, May 1985
"The Dump Out 3 ROM from Watford Electronics represents one of the most sophisticated types of printer dump utilities available for the BBC Micro . . .".

"an extremely sophisticated and powerful dump utility".

"VERDICT – Dump Out 3 ROM has all the facilities which you are ever likely to need for producing printer dumps. The facilities available work extremely well and if printer dumps are something which you require, then this ROM can be recommended to help you to get the best out of your dot matrix printer".

The Micro User Feb. 1985.
"Well, here is that winner"!

"provide(s) some rather sophisticated screen dumps. Producing high resolution paper copies of graphic screens in any (graphics) mode will be the major reason for buying this ROM, and this is where Dump Out 3 performs PAR EXCELLENCE". (Our capitals for their italics.)

"The versatility of *GIMAGE (the graphics dump command) when using these parameters is amazing. Pictures of almost any size, shape, contrast or distortion may be produced without the need for a reducing photocopier or trick photography".

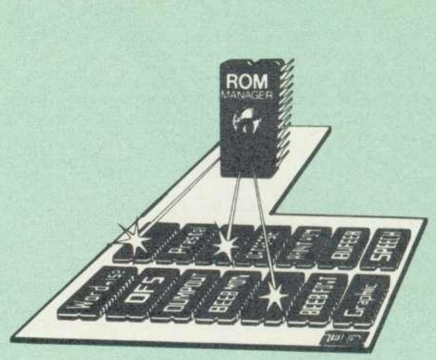
"Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC micro. It is easy to use yet highly versatile, and caters for all BBC screen modes in multitone high resolution printing. Whole, partial, rotated and scaled screens may be dumped to almost any BBC compatible dot matrix printer (see our list at the end of this advert). At £25 it must represent excellent value for money and surely cannot be beaten".

Designed for use with the following printers:

GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Mannesman Tally etc.
Price including comprehensive manual

£25

ROM MANAGER

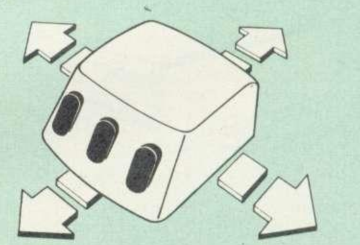


Probably the most powerful way of expanding the BBC micro is from the use of Sideways ROMs. One problem faced by the avid ROM collector is that of ROM command clashes. The solution is very simple in the form of the ROM that "Provides comprehensive management of all your installed ROMs". (Quote from BEEBUG November '84.)
Basically, ROM Manager offers you the ability to turn off any installed ROM, or to send any * command to any specific installed ROM. It is said that imitation is the sincerest form of flattery – Acorn's BBC Plus features many of the abilities of this powerful ROM.
Many more facilities available.

SPECIAL OFFER £18

THE AMX MOUSE

The AMX Mouse needs no introduction. It is simply the best.



Now supplied with the NEW SUPERART Software ROM & Disc at no extra cost.

ONLY: £65 (carr £1.50)

FREE With every AMX Mouse package purchased from us, we are giving away, absolutely FREE, our popular Colour Art. software package worth £15.

AMX DESK Package	**£19.00**
AMX UTILITY Package	**£11.00**
AMX SUPERART Package	**£42**
AMX PAGE-MAKER Pack	**£42**
AMX 3D ZICON Disc	**£20**
AMX Database Disc	**£20**
AMX XAM Educational	**£20**

RB12 MARCONI TRACKER BALL

This popular unit is supplied complete with software.

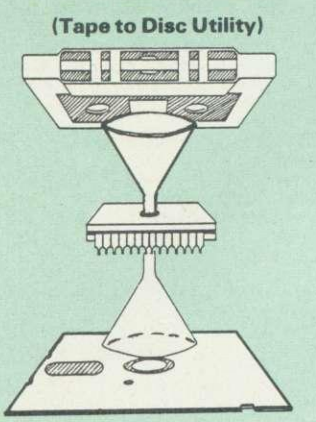
Price: **£50**

FLEET STREET EDITOR

Software pack **£35**

TRANSFEROM

(Tape to Disc Utility)



Not compatible with 1770 DFS.

This advanced and sophisticated utility ROM for the BBC Micro has the following features:

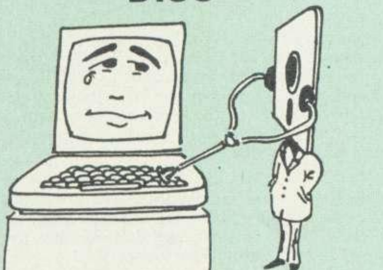
- Fully menu driven for ease of use
- Copes with locked programs
- A very comprehensive built in copying features
- Copies very long adventure games
- Supplied with comprehensive manual

TRANSFEROM is now available in BOTH single and double density versions. The single density version works with both the Acorn and Watford single density DFSs. The double density version works with the Watford DDFS system only.

TRANSFEROM takes your software on tape and saves them onto disc. TRANSFEROM does not stop when one disc is full; you just insert another disc in and carry on with that one! Surely this is the most valuable investment you could make if you have tape software that you wish to transfer to disc! Please specify version required – Single or Double Density.

£25.00

DIAGNOSTICS DISC



The BBC micro is a very complex machine and thus diagnosing a fault can be very difficult. Until now, the only way to discover the nature of a fault was either to find a competent friend with a large degree of patience or to find your nearest dealer and pay him to find out what is wrong.

At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.

The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:

RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.

This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

ROMAS

THE CROSS ASSEMBLER AND MACRO EDITOR FOR SERIOUS PROGRAMMERS!

ROMAS is a carefully designed, sophisticated yet simple to use, development system for serious assembly language programmers. Using the BBC as the development system, you can choose your target system from the following processors:

6502, 65C02, Z80, 8085, 8041, 6809 and Z8 P.S. This includes the Acorn 6502 & Z80.

ROMAS features a powerful expression analyser, making complex table easy to generate. To aid in documentation, fully formatted assembly listings may be produced, with full symbol table output at the end.

ROMAS is provided with a powerful cross referancer to produce a listing of all the labels in a given "source" program; this makes it easy to check to see if you are about to duplicate a label.

The Macro Editor

Features of this powerful editor provided with the ROMAS package include:

- Works in all 40 and 80 column screen modes
- Fast load and save speeds
- Continuous line and column number displays
- Search, replace and move; all available in macros
- Command repetition

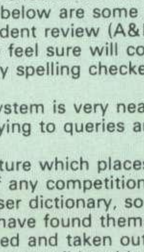
The ROMAS package includes a comprehensive manual, providing detailed documentation and plenty of examples.

A give away at . . . **Only £45**

Please specify 40 or 80 track disc when ordering.

ROM-SPELL

"way ahead of any competition"



ROM-SPELL is probably THE most advanced and fastest spelling checker available for the BBC Micro. Printed below are some extracts from a recent independent review (A&B Computing Nov. '85), which we feel sure will convince you that this is THE only spelling checker worth considering.

"The editing system is very neat and simple, instead of replying to queries and beeps all of the time . . ."

"The other feature which places ROM-SPELL way in front of any competition is the ability to examine the user dictionary, so any spelling mistakes that have found themselves on the disc can be examined and taken out if necessary".

". . . that it is compatible with many of the popular word processors on the market is a good indication that ROM-SPELL is going to be a very popular product indeed".

". . . ROM-SPELL is by far the best spelling checker for the unexpanded BBC B (with or without word processor). It boasts features which are hard to find on conventional spellcheckers on CP/M and MSDOS, namely Spellstar and has a speed/performance ratio of roughly the same as its CP/M cousin. The difference is that the CP/M version would cost the best part of £500".

". . . and with such vital house keeping features as an ambiguous word checker, the ability to edit the user dictionary, a comprehensive manual that is both easy to read and actually ENJOYABLE to learn from, . . . I feel confident that ROM-SPELL will woo the word processing public with no problems at all".

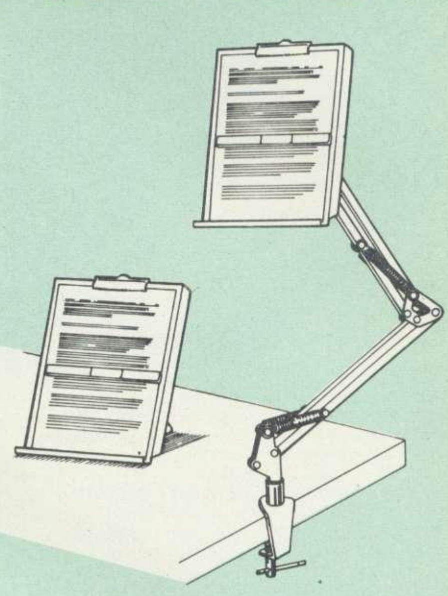
Compatible with: View, Wordwise & Wordwise

Don't settle for less, Buy the best.

£25

(Not compatible with 1770 DFS)
(Please state 40 or 80 track disc)

COPY HOLDERS



How often have you been about to type hand written notes into your computer when you find that there's nowhere to rest the paper or that your notes are resting at the wrong angle to read the type? Whether the notes be your latest program or the draft of a new trilogy, the new Manuscript Holders from Watford are superb for holding your paper at the ideal height and angle to allow you read and type in ease and comfort.

Available in desk resting and shelf clamping versions, these two units hold your paper firmly by means of a magnetic ruler and a clip grip.

Mounting to a convenient flat surface, the two joint anglepoise Manuscript Holder allows the paper to be positioned at virtually any convenient angle whilst only taking up a fraction of the surface area that the paper being held does.

The smaller desk resting Manuscript Holder is useful for the more organised desk where the problem is simply holding the paper at the right angle.

Whatever desk arrangement you use, surely you deserve a Watford Manuscript Holder!

Amazing value at only
Desk Top **£10** (carr. £2)
Angle poise **£14** *(carr. £3)*

All prices in this advert are exclusive of VAT.

REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£13 (40 or 80 track)

BEEBMON

The most powerful machine code monitor for the BBC Micro **£24.**

DISASSEMBLER ROM

ONLY **£16**

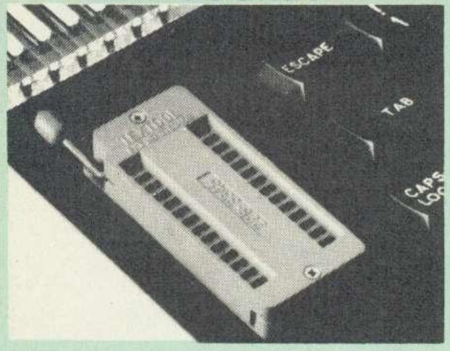
THE INVESTIGATOR

This sophisticated Utility program on disc, enables you to make security back-up copies of most of your valuable Disc Software. Makes full use of all 8271 (will not run with double density DFSs) facilities to discover the precise format of your protected disc so that an exact copy can be produced. Supplied with detailed instructions. Please specify 40 or 80 track disc when ordering.

Only **£20**

Continued →

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£15** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack.

Complete System	**£12**
Spare Cartridges	**£2.50**
Spare Rack	**£1.50**

16K Sideways RAM Modules

This is it! The revolutionary design RAM Module you've been waiting for. Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

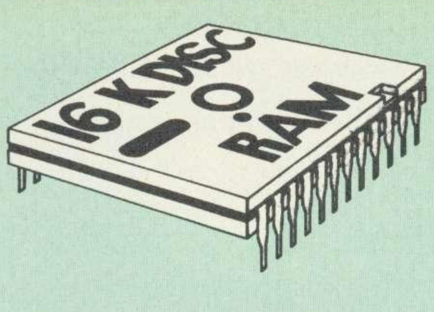
- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£29** (carr £2)

Optional extras

READ and WRITE protect Switches **£2** each
Battery for Battery Backup **£3**

All prices exclusive of VAT



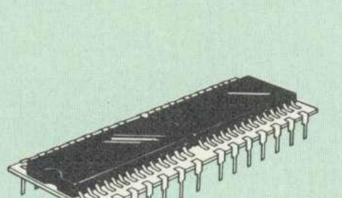
This is the RAM you've been waiting for!! This battery backed up, write protectable 16K sideways RAM board allows you to run from disk every sideways ROM available. Beware of other sideways RAM boards which are not backed up as certain ROMs will not run in these boards even though the RAM can be write protected. The Battery Backup facility allows retention of DATA after power off. On switch on the Micro will think the WATFORD DISC RAM is a ROM. Features available are:

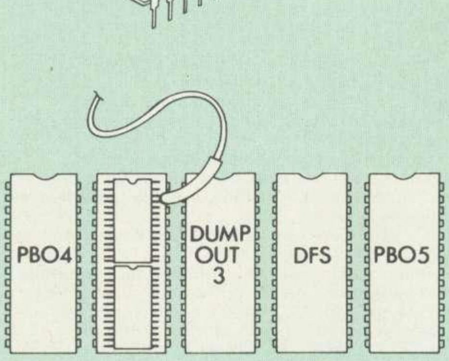
- No soldering or modifications to BBC micro necessary.
- Plugs into normal ROM socket fitting neatly under the keyboard allowing room for other add-ons.
- Easy to use. Comes with disk based software to SAVE and LOAD ROMs. Allows you to make backup copies of your ROMs.
- Disk software can be copied onto other discs when disc is full.
- No messy plugging and unplugging of your ROMs. Simply Load the one you want into DISC RAM.
- Ideal for Professional users to develop ROMs. Backup facility allows testing of final versions without using EPROMs.
- The switch provided allows backup and write protection to be switched off externally.
- Can also be used as 16K printer buffer RAM in conjunction with our Buffer & Backup ROM.

New Low Price: £30 (carr £2)

P.S. 16K DISC RAM Board is not designed to work in conjunction with a Sideways ROM Board.

SOLID STATE 16K SIDEWAYS RAM





This new unit from Watford, which utilises the latest in Static RAM technology, offers 16k of easy-fit sideways RAM in a very compact unit with a footprint no larger than a standard 28pin EPROM. With only a single flying lead terminating in a mini hook-on probe, to fit, (no soldering required) this compact unit works with any BBC Micro with or without a ROM board. ***Compatible with BBC B Plus.*** Like our other 16K RAM Modules, this unit is very simple to fit.

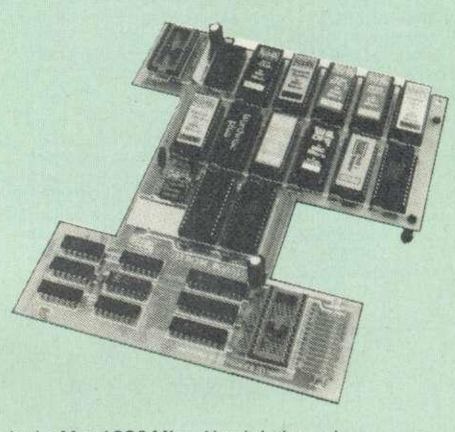
Only **£28** (carr 2)
Supplied complete with comprehensive software on Disc, Operating and fitting instructions.

Do you find the 16K Sideways RAM Units confusing? If so, we have compiled this quick questionnaire to help YOU decide which is the best one for you. If the answer to any of the questions is yes, then use the index number to select from the boards below. Options in brackets indicate possible secondary choices.
Do you require:

- Sideways RAM for a BBC B? Choose 1, 2 or 3.
- Sideways RAM for the B+? Choose 1.
- A small, basic module? Choose 1.
- A sideways RAM module for a ROM board? Choose 1, 2 or 3.
- An easy to use utilities disc? Choose 1, 2 or 3.
- More than one module installed at once? Choose 1 or 3.
- To use sideways RAM as a printer buffer? Choose 1 or 3.
- Battery Backup? Choose 2 (3).
- Write protect for RAM (makes ROM look like RAM)? Choose 2 (3).
- Read protect (allows recovery from crashes)? Choose (3).

Key:
1) Solid State 16k Sideways RAM
2) 16k Disc RAM
3) 16k RAM module

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM boara the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16. Also permissable, are various configurations of RAM (up to 16k) and different sized EPROMs (see below).

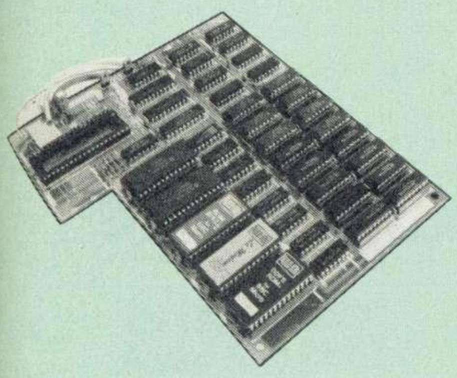
Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 can take the following chips: 2716, 2732, 2764, 27128, 6116, 6264.
- Read protect to make RAM "Vanish"; allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
(carriage £2)

Watford ROM/RAM CARD

A must for all serious users



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM/RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM/RAM Board.

The ROM/RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, should the user wish to upgrade in the future. Please write in for further details.

INTRODUCTORY PRICES:

- *ROM/RAM card with 32k dynamic RAM* ***£45***
- *ROM/RAM card with 64k dynamic RAM* ***£69***
- *ROM/RAM card with a massive 128k dynamic RAM* ***£109***

(carriage on ROM/RAM Card £3)

OPTIONAL EXTRAS:

- *16k plug-in Static RAM kit* ***£3***
- *Battery backup* ***£3***
- *Read and Write protect switches* ***£2*** *each*

Complete ROM/RAM board (all options installed) ***£125***

Le Modem



The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World/wide data transfer system.*
- *Auto Dials, Auto Answers, and is completely controlled by your Micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELESOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple '*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON/OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- *FREE 3 months subscription to MicroLink.*

- *BT Approval applied for.*

Price: **£89** (carr £3)

PROHIBITED from direct or indirect connection to any telecommunication system run by British Telecommunications. Action may be taken against anyone so connecting this apparatus

(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

Nightingale Modem

SPECIAL PRICE to our Customers

£115
(carr £3)

(Price includes: Nightingale Modem, Commstar ROM pack, Cables & Comprehensive manual)

Nightingale Modem without software	**Only £99**
COMMSTAR ROM package only (P&P on modem £2.00)	**£29**
Auto Dial/Auto Answer Board	**£48**
Auto Dial Utilities Disc	**£9.50**
OBBS Bulletin Software	**£20.00**

Viglen Console Unit

Enhance the appearance and convenience of your BBC Micro with the Viglen console unit.

£42 (carr. £4)

BT TELEPHONE CONNECTORS

LJU	1/4A Mini Line Master	**£4.50**
LJU	1/6A Mini Line Slave	**£3.00**
LJU	2/4A Line Master	**£4.00**
LJU	2/6A Line Slave	**£2.50**
LJU	3/4A Flush Master	**£3.95**
LJU	3/6A Flush Slave	**£2.75**
LJU	10/3A Dual Splitter	**£5.50**
	4 Way BT Plug	**£0.75**

Versatile BEEB SPEECH SYNTHESISER Unit

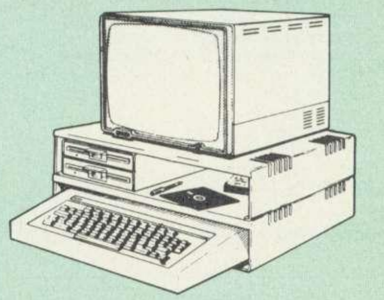


The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	**£11** (carr. £1.50)
DOUBLE BBC PLINTH	**£20** (carr. £2.00)
PRINTER PLINTH	**£10** (carr. £1.50)
SINGLE MASTER PLINTH	**£14** (carr £1.50)
DOUBLE MASTER PLINTH	**£25** (carr £2.00)

Continued

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£48
CARETAKER Basic Utility	£27
Graphics ROM	£23
Disc Doctor ROM	£24
TERMI	£27
COMMUNICATOR	£49
SPEECH ROM	£24
Printmaster	£24

Wordwise £25

Wordwise plus

£40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text/segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS

Supplied on disc. This version requires a WORDWISE-PLUS ROM to be present in the machine. It gives up to 44k of text space on the 6502 2nd processor.

£5

Inter SHEET **£40**

INTER CHART **ONLY: £26**

Computer Concepts' long awaited

Inter-WORD

Only: £49

Special price to Wordwise Plus owners. Please quote your reg. number and pay

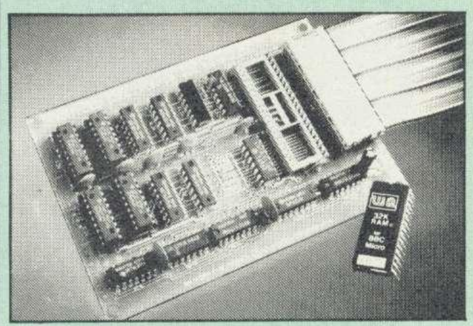
ONLY: £39

All Prices Exclusive of VAT

32K

SHADOW RAM-Printer Buffer

Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B+ or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Ensure COMPATIBILITY with a vast range of hardware (including our ROM board, the ATPL ROM boards, double density boards, second processors), and software (including BASIC, TOOLKIT, VIEW, WORDWISE (1.20+), WORDWISE-PLUS, Music 500's AMPLE). This is because our board, unlike those of our competitors, is connected to the computer by a ribbon cable and has the power consumption of a couple of ROMs!

- Achieve EASY OPERATION with ROM based software. A large range of commands is available for machine code and BASIC users, including some useful *HELP messages, and a comprehensive manual is supplied free.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only: £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORD PROCESSING DEAL ! ! !

Watford Electronics, already renowned for quality products at discount prices, are offering, the truly spectacular BARGAIN OF THE YEAR!

A Watford's 32K RAM Card (offering printer buffering and shadow screen RAM facilities) with the well known WORDWISE PLUS Word processor.

32K Shadow RAM Card/Printer Buffer and Wordwise Plus (a very powerful package) for the absolutely astounding price of:

Only £75 (carr £2)

(P.S. For an extra £14, we will include Word-Aid ROM package for the Wordwise Plus, if bought at the same time.)

VIEW

VIEW WORDPROCESSOR 2.1 ....**£37**

VIEW 3.0 ROM

Price: Only **£56**

HI-VIEW

A special version of VIEW designed for use with 6502 2nd Processor. Available on disc, it offers 47K of text memory.

£36

VIEWSHEET (Acornsoft)	£37
VIEWSTORE	£37
VIEWSPELL	£50
VIEWPLOT Disc	£25

Watford's own Sophisticated VIEW PRINTER DRIVER for Epson FX80 & KAGA KP

Only £10

VIEW DRIVERS FOR JUKI & BROTHER HR15 PRINTERS

Only £10

VIEW/VIEW SHEET PRINTER DRIVER for SILVER REED

(Officially approved by Silver Reed)

Only: £10

OMNIREADER

OCR at a price you can now afford

The manually operated omnireader is preprogrammed to read 4 common type faces – including: KAGA Courier 10, Courier 12, Letter gothic & Prestige Elite. It reads a line of text in about 3 seconds & is ideal for inputting already typed material into wordprocessor packages, such as View or WW, Databases or Spreadsheets. Comes complete with power supply, instruction manual, longrule & Dustcover. Also available on disc for the BBC is a utility program which merges input from the service port with the keyboard thus allowing full editing control whilst using the omnireader. Also included is a Basic program which displays the pixel map image obtained from the omnireader – ideal for doing your own OCR.

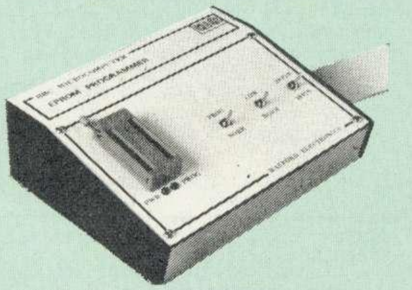
(As seen on the TV programme Micro LIVE)

Price: **£165**

BOOKS (No VAT on Books)

30 Hour BASIC (BBC Micro)	£7.95
40 Best machine Code Routines	£7.95
6502 Assembly Language Program	£19.95
6502 Application	£11.95
6502 Assembly Language Subroutines	£19.95
6502 Development System	£7.50
68000 Assembly Lang. Programming	£19.95
68000 Machine Code Programming	£12.95
68000 Programming the	£22.95
A User Guide to Wordwise Plus	£9.95
A Young persons Guide to BBC Basic	£5.95
Advanced Disc User Guide	£14.95
Advanced BASIC ROM User Guide	£9.95
Advanced Machine Code Technique for BBC	£7.95
Advanced Programming for the BBC Micro	£6.95
Advanced User Guide for BBC Micro	£13.50
Advanced Graphics with BBC	£9.95
Assembly Language Programming on BBC Micro	£11.50
Advanced Programming Techniques for the BBC Micro	£8.95
Adventure into BBC BASIC	£6.95
Applied Assembly Lang. for BBC	£9.95
Assembler Routines for the 6502	£7.95
Assembly Language Programming FOR the BBC Micro	£8.95
Assembly Language Programming on the BBC & Electron	£8.95
Basic Programming on the BBC Micro	£6.95
Basic ROM User Guide	£11.95
Basic User Guide for BBC Micro	£10.00
BBC B+ User Guide	£14.95
BBC BASIC	£5.95
BBC Forth	£7.50
BBC Machine Code Portfolio	£7.95
BBC Micro add on guide	£7.95
BBC Micro Advanced Reference Guide	£10.95
BBC Micro Advanced Programming	£9.95
BBC Micro Book BASIC Sound & Graphics	£7.95
BBC Micro ROM Book	£9.95
BBC Micro Disc Companion	£8.95
BBC User Guide	£10.00
BBC Wargaming	£8.95
BCPL User Guide	£14
Business Applications on BBC	£7.95
Complete FORTH	£6.95
CP/M - 86 User's Guide	£19.95
CP/M Bible	£16.50
CP/M Handbook with MPM	£9.95
CP/M Plus Handbook	£13.95
CP/M Soul of	£16.50
CP/M The software BUS	£8.95
Creative Animation & Graphics	£7.95
Creative graphics on BBC Micro	£7.50
Disc Drive Projects for Micros	£5.45
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
Disc Programming Techniques	£9.95
Discovering BBC Micro Machine Code	£6.95
Disc System for the BBC Micro	£6.95
Exploring FORTH	£6.95
Filing System & Databases for the BBC Micro	£7.95
FORTH on the BBC Micro	£7.50
Functional Forth for the BBC Micro	£5.95
Graphics for Children	£6.95
Graphs & Charts on BBC Micro	£7.50
Guide to BBC ROM	£9.95
Hackers Handbook	£4.95
Hackers Handbook - New	£6.95
Handbook of Procedure & Functions for the BBC Micro	£6.95
Interfacing & Robotics on BBC	£15.95
Interfacing Your BBC Micro	£8.95
Into View	£4.50
Introduction to COMAL	£9.50
Introduction to LOGO	£6.95
Introducing 'C'	£9.95
Introducing CP/M on the BBC Micro Z80 2nd Processor	£9.95
Introducing LOGO	£5.95
Introduction to FORTH	£8.95
Introduction to PASCAL	£17.95
ISO-PASCAL Reference Manual	£9.95
Let your BBC teach u to program	£5.45
LISP 2nd Edition	£14.95
LISP, A Beginners Guide to	£10.95
Logo Programming	£9.95
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering CP/M	£17.95
Master Advance Reference Manual	£19.95
Master Reference Manual Part 1	£14.95
Master Reference Manual Part 2	£14.95
Micronet Handbook	£6.95
Programming the 6502	£16.95
Programming the Z80	£19.95
Sencing & Control Projects for BBC	£5.95
S-PASCAL on BBC Micro	£7.50
Structured Basic	£7.95
Structured Prog. with BBC BASIC	£6.50
Termulator Manual	£4.95
The Complete FORTH	£6.95
The Complete Programmer	£5.95
The Epson FX/KAGA PRINTER Commands REVEALED	**£5.95**
Turtle Graphics on BBC Micro	£7.50
Using Floppy Discs with BBC Micro	£5.95
View Guide	£4.50
Viewsheet User Guide	£10
Using BBC Basic	£4.95
Wordstar & CP/M made easy	£7.45
Wordwise Plus Guide	£9.95
Z80 Assembly Language Programming	£19.95

EPROM PROGRAMMER



The Watford Electronics' EPROM programmer for the BBC micro is a high quality self contained package. Programs all popular EPROMs from 2K to 16K: 2716, 2516, 2532, 2564, 2764 and 27128. All manufacturers' specifications have been followed to program EPROMs at the correct speed – wrong timings could destroy your EPROMs. The unit has its own power supply so does not put heavy loads on the BBC power supply as do some other units. Connects directly to the 1MHz bus following all Acorn recommendations on addressing and bus loadings.

SOFTWARE PACKAGE
The software is supplied on an EPROM which plugs into the Micro and is instantly available with a single command (no time wasting as on Cassette/disc loading). It is a fully purpose designed and ingegrated package to simplify ROM development. The system is menu driven with many prompts to avoid any accidents.

Software facilities include:
Load File – Save File – Down Load EPROM – Program EPROM – Verify – Blank Check – Editing of memory contents prior to programming.
Also included is an automatic system to allow Basic programs to be put in EPROM and accessed through the *ROM filing system. More than one program may be put in an EPROM. All these facilities and more are explained in the comprehensive and clear 15 page manual.

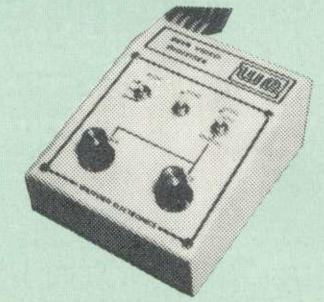
SPECIAL OFFER £69 (£3 carr.)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

BEEB VIDEO DIGITISER



Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROM's to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£110 (Carr. £3)

(Price includes: Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)

A combination of the AMX Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within AMX Pagemaker to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Pagemaker's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Pagemaker's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£129.00** (carr. £3)

Continued →

ARIES CORNER

Aries Computers was the first company to commercially market what is now known as SHADOW RAM. As part of it's continued expansion policy, Watford Electronics is proud to announce that the Aries range is now available exclusively from Watford Electronics and their dealers.

The Aries range, designed by experts offers you the solution to your upgrade nightmares. All the Aries products are compatible with double density disc controllers, modems, second processors, ECONET, hard discs, EPROM programmers and of course, other members of the Aries family and most of the much wider Watford family (some products advertised here perform identical functions and hence cannot be used together). Several major companies now test all their products to ensure compatibility with the Aries B20 & B32.

In quality of construction, the Aries range sits alongside the Watford range in setting a standard against which others are judged. Custom made connectors eliminate the damage to the BBC machine caused by inferior products.

The Aries B-32 Shadow RAM Card

18 months of intensive research and development have produced a worthy successor to the widely acclaimed Aries-B20; the revolutionary Aries-B32. This 'second generation' expansion board features 32k of RAM and a 16k ROM socket.

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus and many othr applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

Price: B-32 **£80** (carr. £2)

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries B-20 and the Aries B-32. For the business user or educationalist, the compact and secure internal fitting is ideal, with the ROM board tucked neatly inside the lid where it will not cause overheating problems. The serious software developer and the hobbyist may prefer to mount the board externally, giving instant access to the sockets for experimental purposes. A zero-insertion force (ZIF) sofket may be fitted to the board to enhance this mode of operation.

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on he board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable 'mother board' which carries the extension ROM sockets and a small 'base board' on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have an B32 or B20, a small adaptor module (the Aries B-12C) is available at a nominal cost. The 6264 static RAM chips used to provide the sideways RAM are advertised elsewhere in our advert.

Price:
Aries B-12 **£40.** Aries B-12C **£5**

THE ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

Aries B-488 Unit: **£238** (Carr £3)

THE ARIES RANGE HARDWARE REQUIREMENTS

Aries B-32 – BBC B, MOS 1.20, hardware plugs into CPU socket.
Aries B-12 – BBC B, MOS 1.20, hardware plugs into all four sideways ROM sockets and connects to the B32 or the B20. The adaptor Aries B-12C module is necessary where these are not fitted.
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Still the only drawing program available for the BBC micro which gives you the ability to draw really large diagrams and scroll them smoothly around the screen stopping to edit them at any time if required.

Pineapple's unique method of storing the diagram information on disc means that the size of diagrams is limited only by the free space on disc, and not the amount of computer memory you have available. (A blank 80 track disc will allow up to 39 mode 0 screens of diagram).

The superb print routines supplied with the program enable large areas of the diagram to be printed in a single print run in a number of different sizes and rotated through 90 deg. if required. Full use can also be made of printers which have a wider than normal carriage available.

The program is fully compatible with the Marconi Tracker ball described below.

PLEASE STATE 40 or 80 TRACK DISC & WHETHER STANDARD BBC or MASTER VERSION IS REQUIRED

PRICE £25.00 + VAT

DIAGRAM UTILITIES

A suite of six utility programs which add additional features to the 'Diagram' drawing program. The utilities include the saving and loading of areas of diagram to and from disc. The ability to display the whole of your large diagram on the screen at one time (in either 4★4 or 8★8 screen format). The addition of borders and screen indents to diagrams, and the ability to shift a whole diagram in any direction.

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MARCONI TRACKER BALL

This high quality device comes with it's own Icon Artmaster drawing program and utilities to enable it to be used in place of keyboard keys, joysticks, or with your own programs.

PRICE £60.00 + VAT p&p £1.75

PRICE INCLUDING 'DIAGRAM' SOFTWARE £79.00 + VAT p&p £1.75

TRACKER BALL for MASTER series

The Pointer ROM is supplied instead of the Icon Artmaster disc and enables the Tracker ball to work directly with the MASTER series computers. (e.g. to use with TIMPAINT etc.). Prices are the same as for the standard tracker ball.

POINTER

The Pointer Rom is available separately for people already owning tracker balls, and comes with instructions for use with the MASTER computer.

PRICE £12.50 + VAT

PCB

This new release from Pineapple is a printed circuit board draughting aid which is aimed at producing complex double sided PCB's very rapidly using a standard BBC micro and any FX compatible dot-matrix printer.

The program is supplied on EPROM and will run with any 32k BBC micro (including Master series). Also supplied is a disc containing a sample PCB layout to demonstrate the programs features.

By using an EPROM for the program code the maximum amount of RAM is available for storing component location and ASCII identification files etc. (Up to 500 components and 500 ASCII component descriptions may be stored for a given layout). These is no limit to the number of tracks for a given PCB, although the maximum size of board is restricted to 8" ★ 5.6".

Using a mode 1 screen, tracks on the top side of the board are shown in red, while those on the underside are blue. Each side of the board may be shown individually or superimposed. A component placement screen allows component outlines to be drawn for silk screen purposes and component numbers entered on this screen may be displayed during track routing to aid identification of roundels.

The print routines allow separate printouts of each side of the PCB in a very accurate expanded definition 1:1 scale, enabling direct contact printing to be used on resist covered copper clad board.

This program has too many superb features to describe adequately here, so please write or 'phone for more information and sample prinouts.

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CONVERTER LEADS

Converter leads to enable the Trackerball to run mouse software and the mouse to run trackerball software (inc. DIAGRAM). Please state which way round when ordering.

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(ACORN USER magazine review, April 1986)

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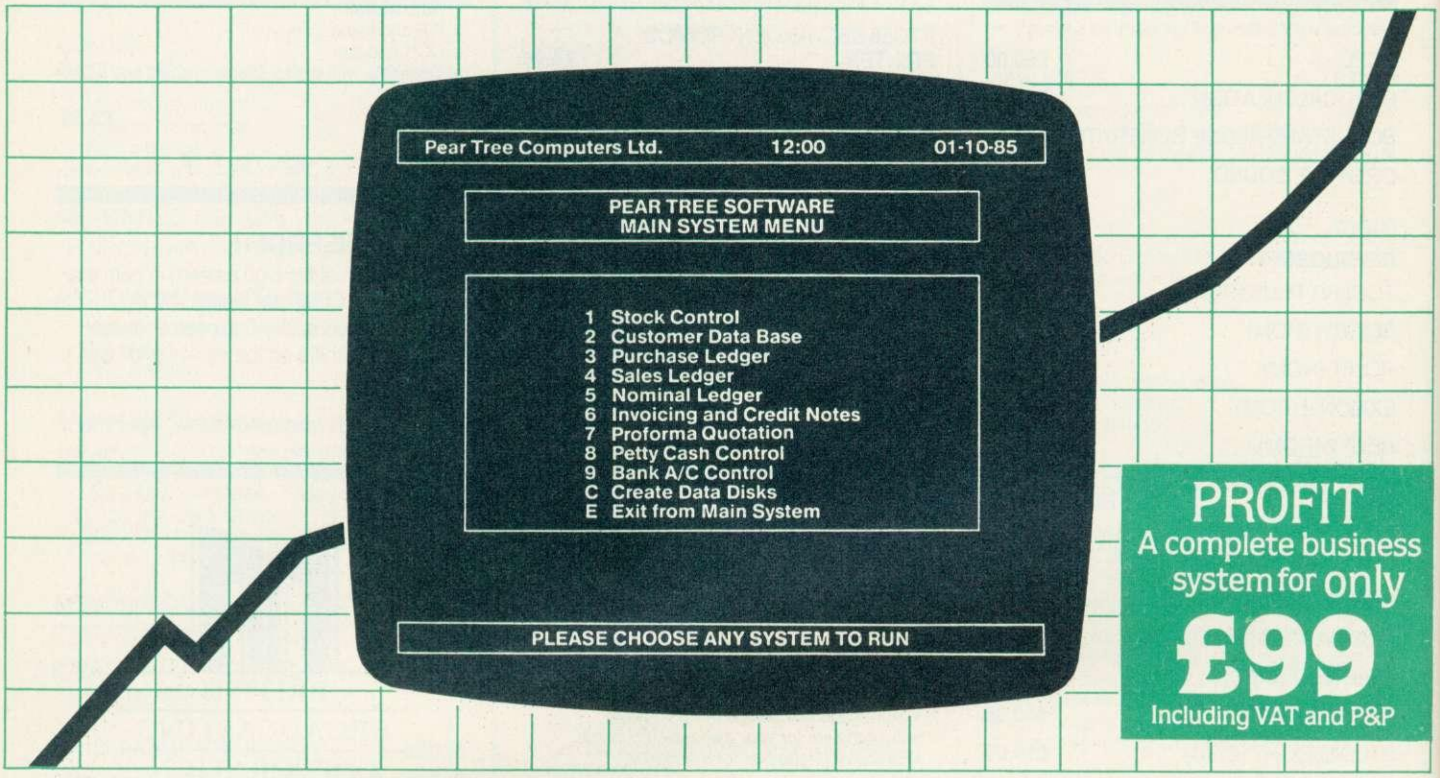
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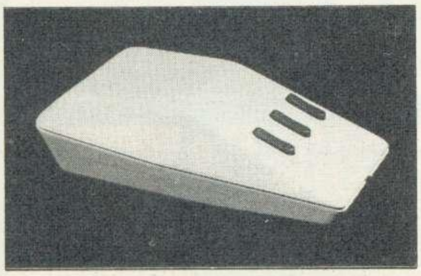


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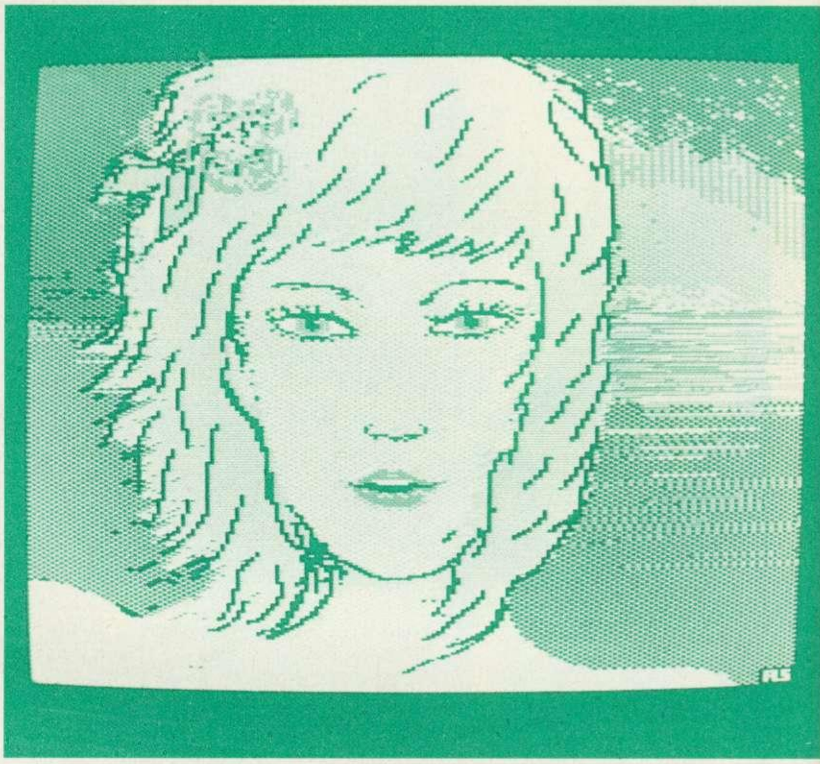
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With the ultimate in art packages comes the ultimate mouse – Megamouse. Built to professional standards and comfortably shaped, it provides sensitive, accurate movement, that is unbeatable.

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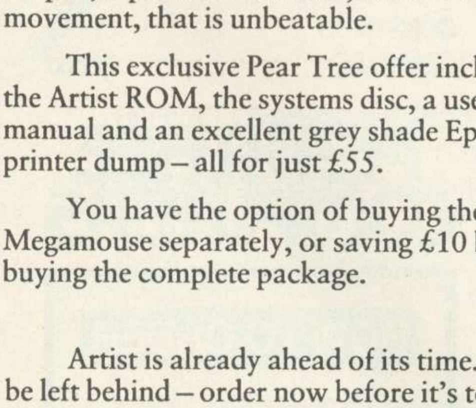
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ROOM FOR IMPROVEMENT

Our regular columnist turns his hand to interior design and programs his micro to do the donkey-work in planning kitchens and bathrooms

Joe Telford

Decorating is always a strenuous affair, and whenever I feel strain coming on, I reach for the computer to help, with mixed results in this case. I had attempted to program the Robot Arm to paint, but it spent so much time admiring its work that I suggested it return to its usual mealtime gong-striking task.

The Nestec buggy, on the other hand, was most useful, shunting pieces of furniture around, until it shunted Mrs T out the patio doors into the rosebushes!

Planning and design, I decided, were where the BBC micro's brains were best employed. I had wandered round the local retailers looking for kitchen, bedroom, and other assorted fitments. We soon realised there was a bewildering choice, in a wide variety of sizes. So donning my Mr Spock look I applied some logic to break the problem down into four stages as follows:

1. We could choose a particular style of fitments for any room by visiting a showroom and looking at the range.
2. We could get the sizes and prices by bringing home leaflets.
3. We could draw plans to scale to fit the furniture into a particular room.
4. Once the third stage was done to our satisfaction we could order the units required.

I decided that the most appropriate computer application would be in handling the third item in our list, the production of plans.

Having defined the application, I set about designing a package to do the job. The resulting five programs are given on yellow pages as listings 1 to 5.

Once the Menu is loaded it is simply a case of selecting the appropriate program and pressing Return. Within each program it is possible to rerun that program or to return to the Menu. In any program other than the Menu, if you are doing something which you do not want to do, press Escape and this will restart a safe loop. Press the cursor keys to confirm that this has happened (something on the screen will move).

If you are worried that something is really astray then Shift f0 will always rerun that program and f0 will call the menu. Study figure 1 (above) carefully before progressing, as this indicates the facilities provided by the keyboard for each program.

What keys do in the Menu program

KEY	FUNCTION
Cursor ↑ ←	Move to last option
Cursor ↓ →	Move to next option
Return	Select and activate option
Escape	Normal Escape
Break	Normal Break

What keys do in graphics mode in the Room, Furplan and Planner programs

KEY	FUNCTION	
Function keys	As indicated on screen	
Cursor keys	Up, down, left, right, move graphics cursor	
D	Draw and record	
F	Fill and record (see text)	*only "ROOM"
T	Insert text and record	*only "ROOM"
M	Move and record	
E	Exit to menu in Room/Exit to furniture selection in others	
A	Select UserDump	
P	Select Printmaster dump	
N	Select no dump	
S	Save file	* not "PLANNER"
R	Rotate and S = Rotate in "PLANNER"	
Escape	Abort current job – return to main loop	
Break	Normal Break	

What keys do in furniture selection mode in the Furplan and Planner programs

KEY	FUNCTION
Function keys	Only selected keys operate: detailed on screen
Cursor ↑	Move up furniture list
Cursor ↓	Move down furniture list
Return	Select item of furniture
Other keys	As above
	NB "E" exits to menu

Figure 1. How the control keys work on each program – and you can see the facilities that are on offer

Whether you use the programs on tape, disc or a network filing system is up to you, but here are some pointers. The package will work with tape, but it's a major management task. I would suggest forgetting about the Menu and organising the programs as follows:

TAPE 1: SETUP then ROOM
TAPE 2: FURPLAN
TAPE 3: PLANNER
Then use one blank tape per file, eg:
TAPE 4: BEDROOM
TAPE 5: FITMENTS
The package works well with a disc filing system (DFS, DNFS) provided the memory limit is no greater than &1C00. Ensure that you include an auto-boot. ADFS users' should make sub-directories for rooms and fittings files. With the network filing systems (NFS, DNFS), filing on Econet is slow, unless you have ANFS, but it's no great hardship. Users with shadow RAM or second processors can upgrade the Room designer to run in mode 0 – see yellow pages for details.

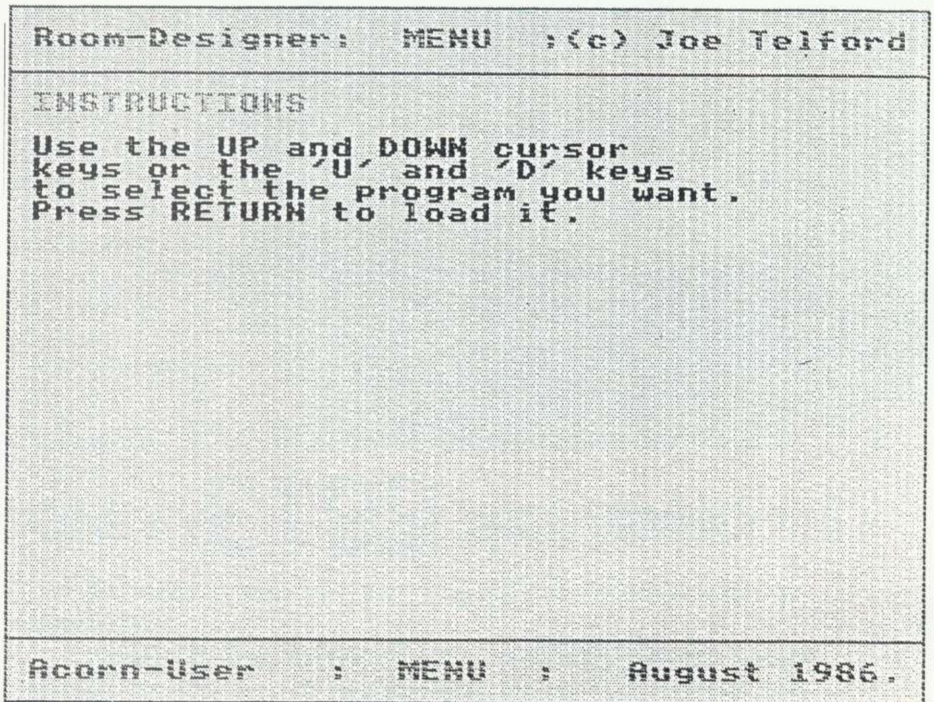


Figure 2. Menu program's instruction screen. Press up or down cursor keys to call complete screens

The Menu program

Once the Menu program (listing 1) is typed in from the yellow pages, save it to disc or tape:

SAVE "Menu"

so that it can be called correctly by the other programs. It is also useful to add an autoboot:

```
*OPT4,3
*BUILD !BOOT
0001*BASIC
0002 MODE 7 :CH."Menu"
0003
Escape
```

This will chain "Menu" whenever the Shift and Break keys are pressed together.

Once Menu is run, it defaults to an introductory screen (figure 2). Simply by pressing the up and down cursor keys, complete screens are presented. Each screen can be acted upon by pressing Return. For example, when the screen shown in figure 3 is visible, pressing Return will chain that program. The two exceptions are the 'end' screen which terminates the program and the 'instructions' screen of figure 2 which ignores the Return key.

Setup and Room

The programs Setup and Room are shown in the yellow pages as listings 2 and 3 and once they have been individually typed into the computer, they should be saved with the following names:

SAVE "SETUP"
SAVE "ROOM"

respectively. They can then be called from Menu and can call on Menu as required.

There are two programs in this section because I decided to use mode 0 for this option, so text could be easily displayed on a room plan for later reference.

The versions carried in the yellow pages use mode 4 and so will work on all machines, but mode 0 conversion details are included in the 'How to enter' box. To reduce program size, the screen layout is drawn by one program, and used by the second. Screen drawing is the task of Setup which is short. Look at its listing: it simply sets the screen colour, prints title information, a function key-strip and some borders. Then it defines the function keys and chains "ROOM".

Once Room is loaded, a cursor cross flickers in the bottom left corner. This is the 'drawing point' of our computer pencil. At the same time a control panel of information appears in the text area on the right of the screen (figure 4) as follows:

Space free: There is room for 40 actions like MOVE, DRAW, FILL and TEXT in mode 0. If an 'Out of Space' problem continually occurs, reduce the actions; most rooms can be drawn with 20 to 30. As each action is used, the Space Free is decremented. If an action is deleted, then Space Free is increased.

Distance to last corner: The distance to the x,y value of the last action (usually a corner) is marked in either inches or centimetres depending on the units set with Shift f3. This is continually updated as the cross cursor moves.

Scale: This is an arbitrary value which can be set so that once the largest room in a house is designed, other rooms can be planned to the same size. It has no defined relation to scale on the ground, though users can easily define such a relationship, using a specific screen dump.

There is a one-line window above the function keystrip. It is used to pass multi-word messages between the program and the user.

Figure 1 shows the facilities available. The whole program is driven by single key inputs. The function keys are most frequently used, so we will examine them first:

Key	Function
Shift f0	Re-runs the program
f0	Chains "MENU"
Shift f1	Loads a specified roomfile
f1	Saves a specified roomfile
Shift f2	Deletes the last graphics action
f2	Stores a move to this graphics point
Shift f3	Toggles between inches and centimetres
f3	Stores a draw to this graphics point
Shift f4	Reduces the scale of the drawing (drawing itself is not altered)
f4	Stores a fill from this graphics point (only on Master, or see later text)
Shift f5	Increases the scale of the drawing (drawing itself is not altered)
f5	Stores text at this graphics point

Most of these keys have identical actions in the Furplan and Planner programs. Only the differences will be mentioned in those programs.

In Room and in the graphics modes of Furplan and Planner, the cursor keys behave identically. Each press of a cursor key will move the cursor 1in or 1cm. When used with Shift the movement is 10in or 10cm.

To draw a room first select the units in which you have measured your rough plan. Simply press Shift f3 until the message 'ins' or

'cms' appears in the right text column. Next turn your rough plan so that its longest side matches the screen width. A few sums now: what is the overall length of your room? Count the axis marks along the top of the screen. Each mark represents 10in or 10cm. Will your plan fit? If not, use Shift f4 and Shift f5 to alter the screen scale until it will.

Now move the cursor cross to an appropriate corner and press f2 or 'M'. This is the reference point for the rest of the room. Move to the next corner and press f3 or 'D' and a line will be drawn. Continue doing this until the room is drawn completely. Remember not to use all the free space, and remember only to include permanent fixtures in the room. For example, don't include cookers, but do include fireplaces, central heating radiators, windows and doors.

Figures 4 and 5 show a room half completed and then finished. Notice on figure 7 that a radiator and window ledge are combined on the plan.

Once the room has been drawn, if memory still allows, we can add text and fill the space around the room to improve presentation. Move the cursor cross outside the room and press f4 or 'F'. On a Master the complete exterior will be filled. On a BBC micro you will have to add a procedure shown later and you might have to do two or more fills.

To add text move to the position where you want and press f5 or 'T'. The cursor will vanish but you can type the text required. As figure 6 shows, text is displayed white on black or black on white, automatically. Mistakes can be erased by pressing Shift f2. This redraws the room but deletes the last point. Because of the time involved in room drawing I suggest that you leave filling to last. If you realise that you've made a mistake five moves ago then, sadly, you must delete the last five moves and redraw them.

Once a room is drawn it can be saved to disc. Press f1 or 'S' and after asking for a filename, the file will be saved. If the file already exists, you will be told and the save will be aborted. It's possible to save a partly finished room to finish later. To reload a file press Shift f1 and after supplying the computer with a filename the file will load. If the file doesn't exist then you are informed and the load aborts.

Pressing the CTRL and '@' keys at any time will dump the screen to a printer if you have a printer control chip. The two chosen were Computer Concepts' *Printmaster* and *Acorn User's* own *UserDump*, though others could be added. Initially, no ROM is selected. Pressing 'A' selects *UserDump* and 'P' selects *Printmaster*. Hitting CTRL-@ without selecting a dump is ignored. Selecting a dump which doesn't exist is fatal. Make sure you save files before dumping!

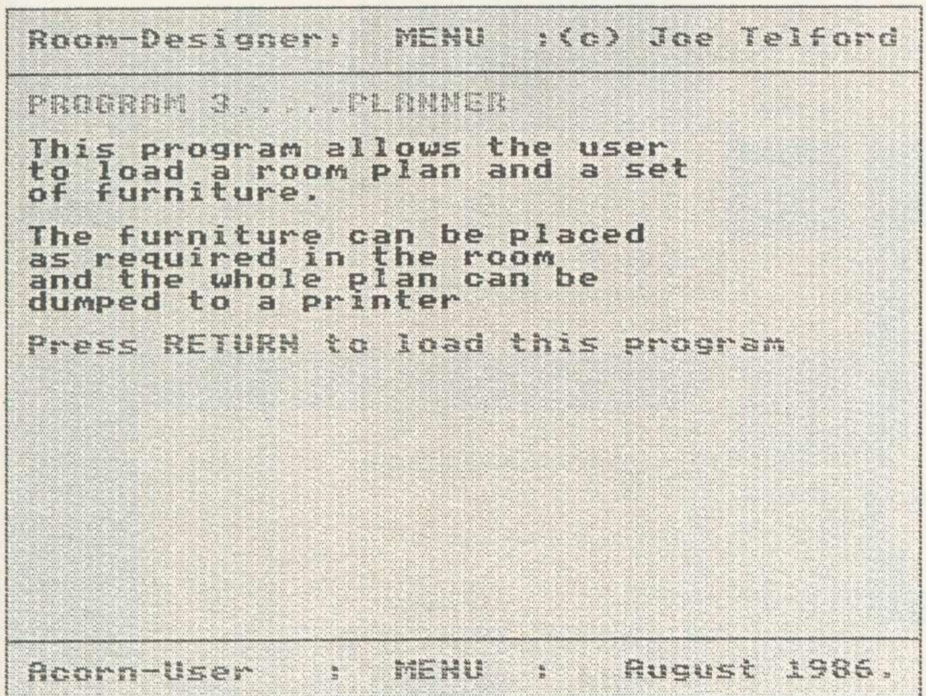


Figure 3. When this screen is called up, pressing Return will chain the Planner program

Improving on Room

There are three main areas of improvement for Room, which have not been included because of lack of space in the BBC micro. A Master could cope with them, and here's what you need to know to be able to implement them.

Adding another dump ROM: imagine that you have a screen dump ROM called *Bugdump* and you would rather call it up instead of *UserDump*. If the command for that ROM is BDUMP 0 for a mode 0 screen, then we alter our program to read:

490 IF a$="B" dy$="B" PROCm ("BUGDUMP ROM selected")

2140 IF dy$="B" THEN *BDUMP 0

Handling a 'bad command' message: if you have a particular ROM dumper in your machine and you accidentally select a different dump, then when CTRL-@ is typed there will be a fatal error. This can be avoided by amending the PROCerr routine:

105 IF ERR=254 PROCm ("Wrong ROM Dump!"): PROCdelay: ENDPROC

Those readers using the Master 128 can use an additional 'fill' option. Just delete the REM on line 1020.

Furplan

The program Furplan is shown in the yellow pages and once it has been typed into the micro it should be saved thus:

SAVE "FURPLAN"

It can then be called from Menu and can call on Menu as required.

I decided to use mode 4 for this option, and to exclude text and fill features which are less important. Hence there is no need to reduce program size, and one program can set up the screen and produce the furniture file.

Once Furplan is loaded, the right-hand side text window flickers once and the cursor keys will move a highlight bar up and down this window. This is the text mode. On pressing Return one of the 'spare' items is selected and its name is asked for. Having typed its name, we can progress to the graphics mode and draw it just like the room design of the last program. When one piece of furniture is designed, it can be added to the set by pressing f1 or 'E' and then another spare piece can be selected. Notice that the scale is set permanently and adequately covers the size from 'waste-bins' to 'double-beds'. This cannot be altered.

The twin modes of text and graphics

The function keys behave differently in the two modes (see table 1, overleaf).

In the graphics modes of Furplan and Planner, the cursor keys behave identically. Each press of a cursor key will move the cursor 1in or 1cm left, right, up or down. When used with Shift the movement is 10in or 10cm. In text modes the cursor keys can be used to select a new item of furniture.

The message window is a one line window above the function keystrip. It is used to pass multi-word messages between the program

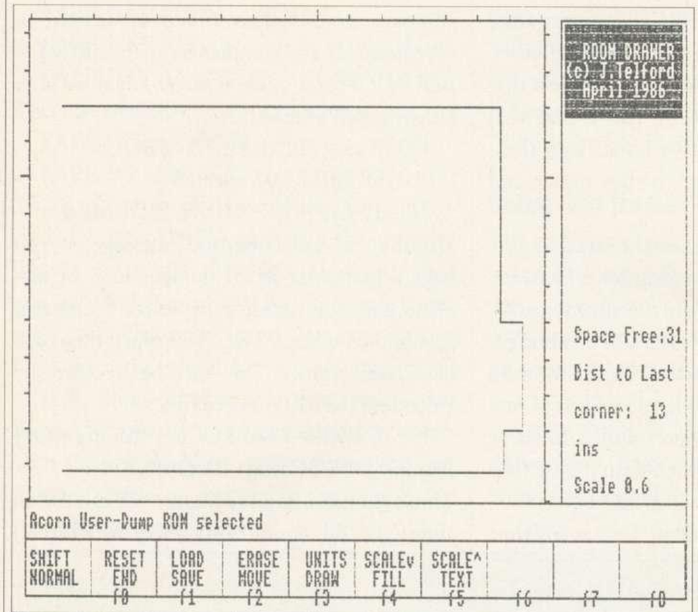


Figure 4. An early stage of composition with Room

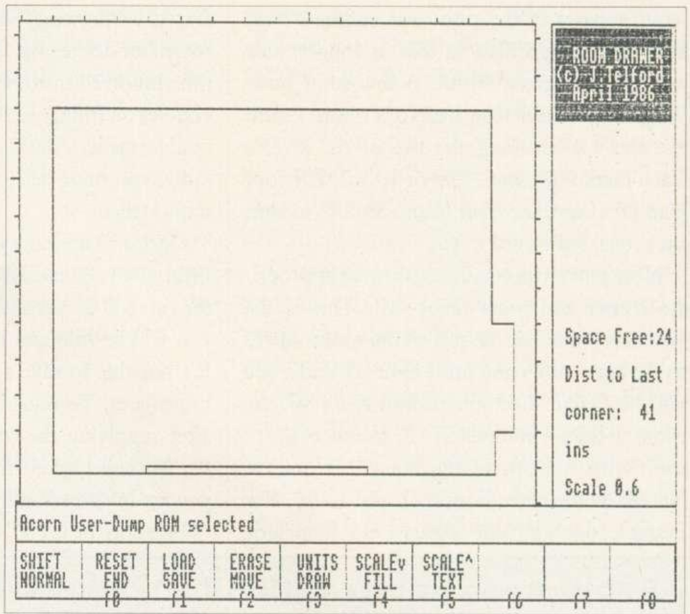


Figure 5. The finished Room with door and window marked

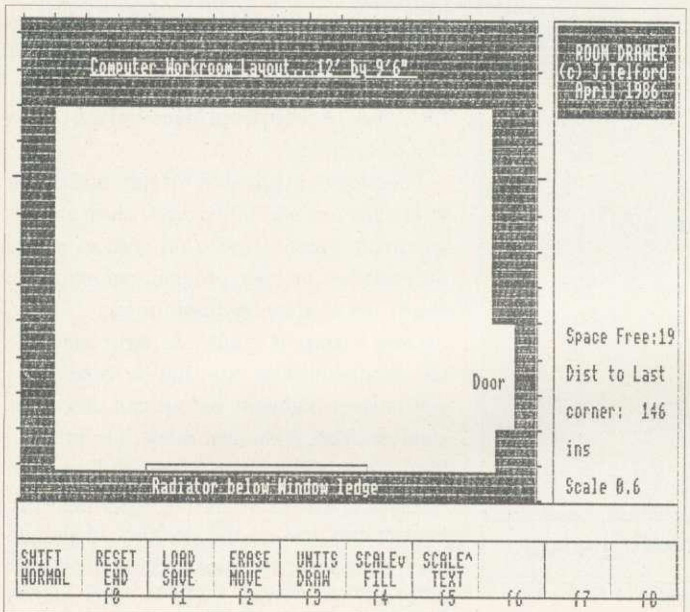


Figure 6. Text can be added easily if memory allows

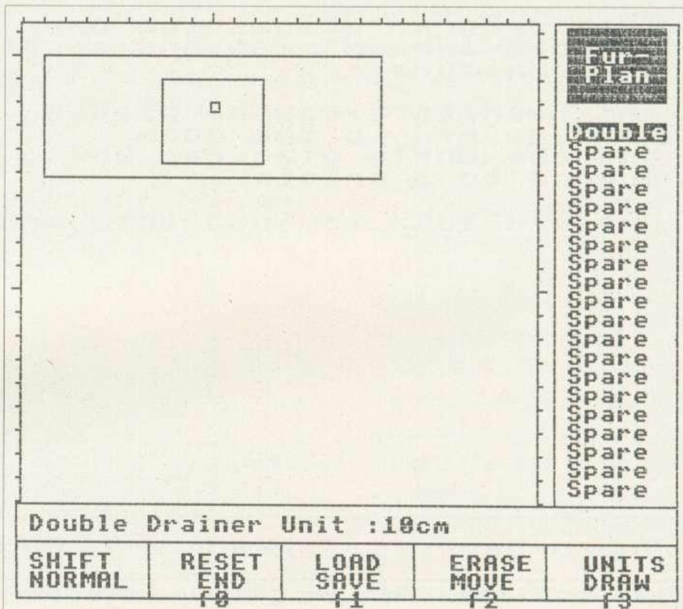


Figure 7. A double-drainer sink unit drawn with Furplan

Key	Graphics	Text
CTRL – @	Dump	
Shift f0	Rerun the program	
f0	Enter text mode	CHAIN "MENU"
Shift f1	Load a specified furniture file	
f1	Save a specified furniture file	
Shift f2	Delete last graphic action	NONE
f2	Move to point	NONE
Shift f3	Toggle between Inches and Cms	
f3	Draw to point	NONE

For other keyboard keys refer to figure 1

Table 1. How keys work in text and graphics modes

and the user. It normally keeps track of the measuring as a drawing progresses.

Drawing furniture

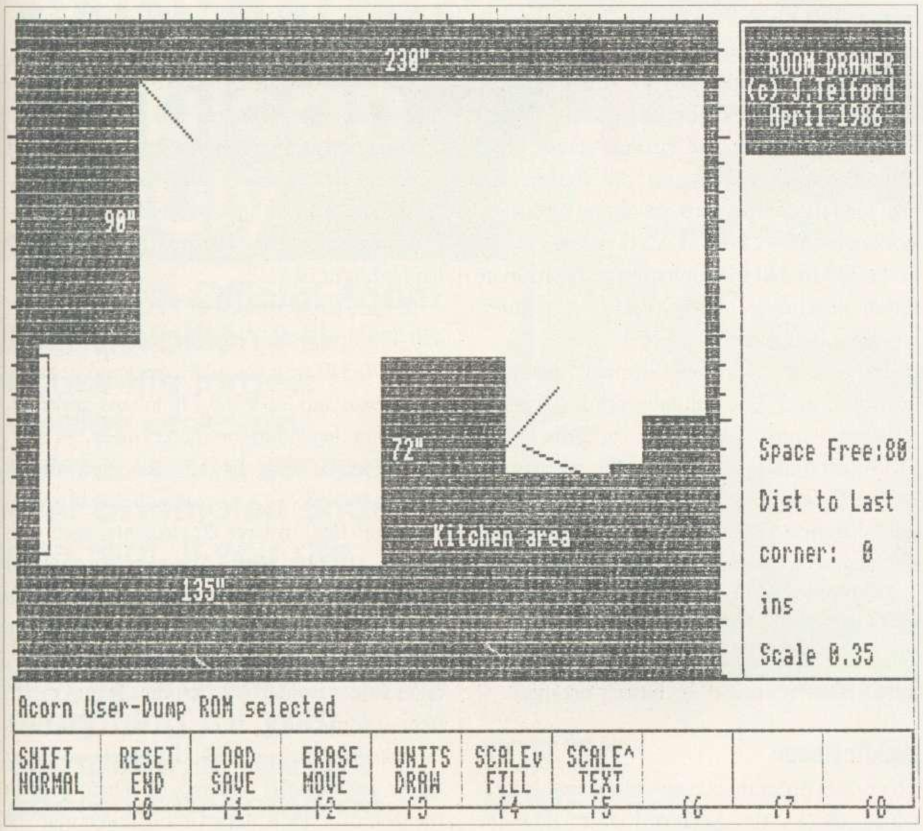
First select the units in which the furniture is to be measured, by pressing Shift f3. Move the highlight bar with the cursor keys to the first 'spare' item and press Return. Now type in the name of the item in the message window, and hit Return.

The graphics cursor will start to flicker. Now move the cursor cross to an appropriate corner and press f2 or 'M'. This is the reference point for the rest of the pieces of furniture. Move to the next corner and press f3 or 'D' and a line will be drawn. Continue doing this until the item is drawn completely. Remember not to use all the free space (there are only 20 points available for each of the 20 items available). Once drawn go back to text mode with f1 or 'E' and select the next piece of furniture. If you reselect a finished piece of furniture, then when you are asked for its name press Return by itself to re-examine the item or add to it. Type another name to start over.

Figure 7 shows a double-drainer sink unit complete with its measurements.

If you make a mistake then it can be erased by pressing Shift f2; this redraws the item but deletes the last point. If you realise that you've made a mistake five moves ago then, sadly, you must delete the last five moves and redraw them. If you erase all the parts of an item then it will become 'spare' again.

Once a set of furniture is drawn it can be saved to disc. Press f1 or 'S' and, after asking



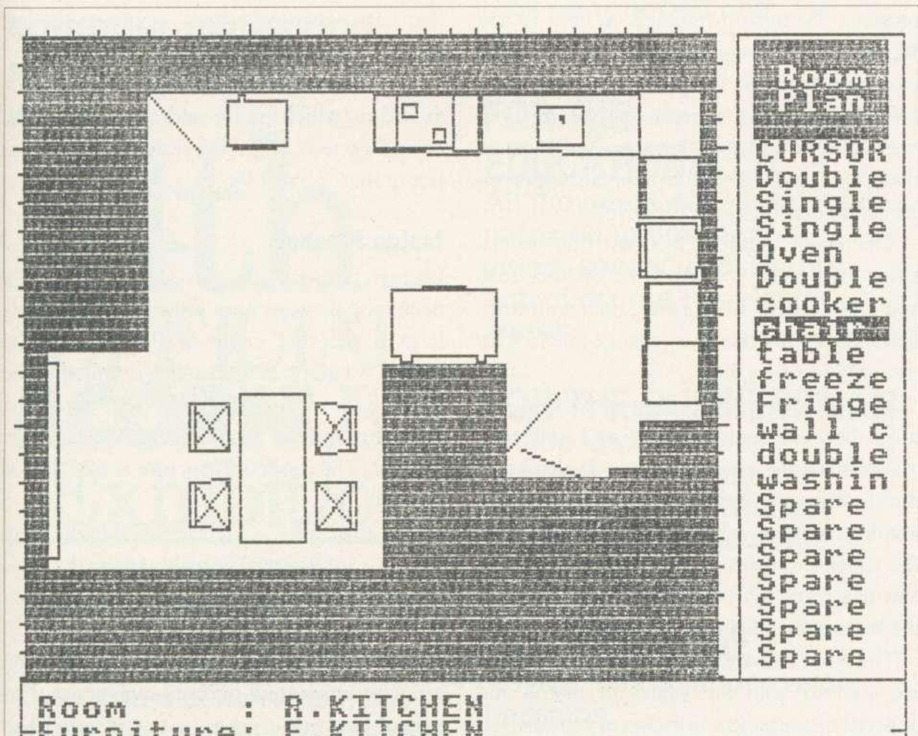


Figure 8. Plan of an empty kitchen (top) and with furniture in place (bottom)

for a filename, the file will be saved. If the file already exists you will be told and the save will be aborted.

It is, of course, perfectly feasible to save a partly finished set of furnishings to come back to later. To reload a file press Shift f1 and after supplying the computer with a filename the file will load. If the file doesn't exist then you are informed and the load aborts.

The same dumping facilities of Room are available in Furplan. Use the dump routines in the same way.

Improving on Furplan

The main areas of improvement for Room can also be used with Furplan. There is no space problem with Furplan so readers might like to make the amendments indicated below (notice that the fill routine is not used).

Adding another dump ROM: Adding BDUMP 4 for the imaginary *Bugdump* ROM.

330 IF a$ = "B" dump$ = "B" PROCmess("BUGDUMP ROM selected")

730 IF a$ = "B" dump$ = "B" PROCmess ("BUGDUMP ROM selected")

2350 IF dump$ = "B" THEN *BDUMP 4

Handling a bad command message: Amending the PROCerr routine to prevent problems with 'bad' commands when accessing the wrong dump ROM try:

175 IF ERR = 254 PROCmess("Wrong ROM Dump! "): PROCdelay:ENDPROC

Planner

Planner is the last program in the suite shown in the yellow pages and once it has been typed into the computer, save it with the name:

SAVE "PLANNER"

It can then be called from Menu and can call on Menu as required.

I used mode 4 for this option, and excluded text facilities but left the fill feature of Room available either directly on a Master 128 or indirectly using the add on routine shown previously. As with Furplan the single program sets up the screen and draws the plans.

Once Planner is loaded, the right-hand side text window flickers once and the cursor keys can move a highlight bar up and down this window. This is the text mode. Unfortunately nothing can happen until a Roomfile and a Furniture file are loaded. To do this press Shift f1 and give the filenames as asked. These will load, the room will be drawn and the furniture list will appear. The furniture is automatically scaled to match the room size.

The next stage is to use the cursor key to move the highlight bar to select a piece of furniture and press Return when you've done that. The program switches to graphics mode and the item will be drawn in the room and can be moved with the cursor keys. It can also be rotated, drawn and erased if drawn by mistake. Once an item is satisfactorily placed then pressing f1 or 'E' allows the next item to be selected. Figures 8a and b show how an initially bare room can be furnished. It can easily be rearranged.

The function keys behave differently in the graphics and text modes.

Key	Graphics	Text
CTRL-@	Dump	
Shift f0	Rerun the program	
f0	Enter text mode	CHAIN "MENU"
Shift f1	Load specified room & furniture files	
f1	Rotate item right	NONE
Shift f2	Delete last graphic action	NONE
f2	Rotate item left	NONE
Shift f3	Toggle between inches and cms	
f3	draw item	NONE

For other keyboard keys refer to figure 1.

In the graphics mode of Planner, each press of a cursor key will move the cursor or an item of furniture 1in or 1cm left, right, up or down. When used with Shift the movement is 10in or 10cm. In text modes the cursor keys can be used to select a new item of furniture or a cursor cross for measurement. The message window is a one-line window above the function keystrip. It is used to pass multi-word messages between the program and the user.

If you make a mistake then it can be erased by pressing Shift f2 – this redraws the item of furniture in black. If an item is mistakenly drawn and then another one selected, you must reselect the incorrectly drawn item and move it to cover the screen image then erase it.

To load a set of files for a room press Shift f1 and after giving a filename the roomfile will load. If the file doesn't exist then you are informed and the load aborts. Do the same to load a furniture file. The dumping facilities are the same as Furplan's. You can make the amendments to Planner which we made in Room.

Inside Menu

The program is based around reading the keyboard and taking an appropriate action depending on which key is pressed. It uses the *FX4,2 command to allocate letters to the cursor keys. The letters used in lines 70 to 100 are 'U' and 'D'. The next few lines from 120 to 240 set up the screen colours and an initial screen display to indicate that this is the Menu program. Note that line 230 sets the centre of the screen as a text window, to make printing easier. There are five options available:

- Program 1 .... ROOM
- Program 2 .... FURPLAN
- Program 3 .... PLANNER
- The Instructions for Menu
- An END option

Initially the 'pointer' at line 250 is set to 4 which indicates that the instructions are required. PROCshow displays the appropriate screen pointed to by 'pointer', and then the main loop from lines 260 to 310 is entered. This loop only checks for the keys 'U', 'D' and Return, and shows the current screen. Exit from the loop is only via the Return key provided the instructions are not on screen:

```
UNTIL A$=CHR$13 AND pointer < >4
```

Lines 320 to 340 then initiate the appropriate action depending on the value of 'pointer' when the Return key is pressed.

The procedures 'room', 'furplan', 'planner', 'instruct', and 'end' simply print out their respective menu options for the user. PROCrect draws rectangles or fills them in.

The Escape key behaves as normal, but it can be altered to force a return to the instruction page. To do this simply add:

```
245 ON ERROR IF ERR < > 17
REPORT:P." at ":ERL:END
```

This traps all errors but only ends the program if the error isn't caused by hitting Escape.

Inside Room

The Room program is essentially a simple loop which checks the keyboard and takes the appropriate action depending on what key is pressed. The main program is in lines 70 and 80. DEFPROCdesign is the body of this main loop and it is split into three sections. Lines 140-190 update the current text information; lines 200-260 wait for a keypress and generate the cursor, and lines 270-510 initiate appropriate action depending on the keypress.

The major array is the two dimensional string array r$ (,) which is set by lines 1690 and 1700 to have 40 elements, each with three fields. To shrink this array change line 1690 to make f% less than 40.

The array has to be a string array because it holds the letter command MDF or T (if T, then it also holds the message string). It also holds the co-ordinates of that command's associated graphics position, which it does by converting the x,y co-ordinates to two strings. The variable p% takes values from 0 to 40 to point at the last command in the room array.

The other two arrays are r() and u$(). These are used to hold the values of metric and imperial measurement in inches or centimetres. The variable up% toggles between 0 and 1 to point to inches or centimetres, and to vary the side scale markings appropriately.

The other major variables are x and y, which are the address of the cursor cross on screen, and s, the variable scale of the drawing.

Inside Furplan

Furplan is essentially two loops nested in a main loop between lines 120 and 150. The first loop is the text mode of PROCselect. The second is a graphics loop which bears great similarity to that of the Room program. Both loops check the keyboard and take the appropriate action depending on what key is pressed.

In the text mode of PROCselect: line 230 waits for keypress; lines 240-340 initiate appropriate action; and line 350 updates the furniture list highlight bar.

In the graphics mode of PROCdesign: lines 430-460 update the current text information; lines 470-540 wait for a keypress and generate the cursor; and lines 560-740 initiate appropriate action depending on the keypress.

The major array is the three dimensional string array p$ (, ,) which is set by lines 1850 and 1860 to have 20 elements, each with 20 sets of three fields. The array is designed identically to the r$ (,) array of Room, to make file handling of the majority of the program suite compatible. The variable fp% takes values from 0 to 20 to point at the current item of furniture.

Apart from r() and u$(), the other two major arrays are name$() and fp%(). These contain the name of each item of furniture and the number of graphics commands needed to draw that item. Then fp% (fp%) points at the last graphic command of a piece of furniture.

The other major variables are the ubiquitous sx and sy, which are the address of the cursor cross on screen, and s, the scale of the diagram (set in this case to 1.00).

Inside Planner

Planner is essentially two loops nested in a main loop between lines 130 and 160. The first loop is the text mode of PROCselect, the second is a graphics loop which is similar to the loop of the Room program. Both check the keyboard and act according to which key is pressed. The program structure is like that of Furplan.

The array rp$ (,) is identical to the array r$ (,) of Room. The main array is the three dimensional numeric array p (, ,) which is set by lines 2030 and 2040 to have 20 elements, each with 20 sets of three fields. The array is numeric and refers to each point of an item of furniture using polar co-ordinates. The variable fp% takes values from 0 to 20 to point at the current item of furniture.

Apart from r() and u$(), the other two major arrays are name$() and fp%() which behave identically to their counterparts in Furplan.

The major variables are sx and sy, which are the address of the cursor cross on screen, and s, the scale of the room.

Joe's five listings forming the interior design package are on the yellow pages. *See index on page 121*

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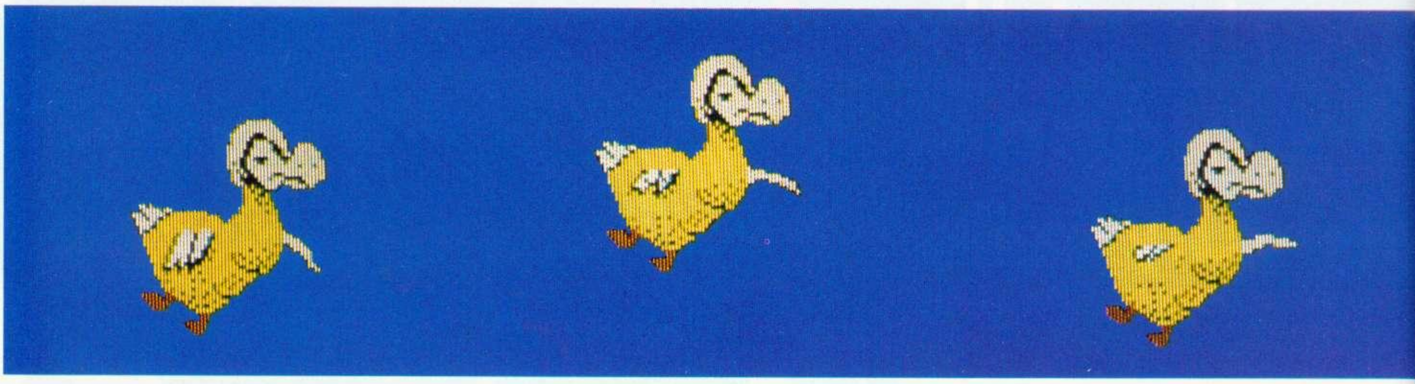
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Michael Sherratt and Bruce Smith

The Moving Picture Program is in fact a suite of six programs for creating animated graphic sequences on your micro similar to that shown in the series of screen shots of dodos above (included on the August listings disc). You will need a BBC B, B+ or Master computer fitted with discs and running a standard DFS. The picture program will work on network machines but will not work with a tape system. The programs cannot run on an Electron.

Each of the six programs has a specific purpose, and one of them is a Menu which links the other five programs together.

Initially they were written with one purpose in mind – to allow detailed animation sequences to be created easily. However, it soon became clear that other uses were practical.

Preparation

Creating an animated sequence from scratch requires careful preparation, but once you've mastered the techniques, it's all surprisingly easy. However, until you've got the hang of it, keep to simple animated pictures. To that end, there's a step-by-step guide to using the package at the end of this article, where we create a simple rolling robotic eye.

The first of the six programs which form the Moving Picture Program is the Menu (listing 1). In addition to giving easy access to the various parts, this also controls where programs are loaded within memory, and so should not be discarded.

To animate a picture you first need a graphic design. The dodo in the sequence had first of all to be created with a graphics package. *Acorn User* has presented four such packages over the past year so you are spoilt for choice, and the most recent was *Super Painter* in January's issue. You can of course use a commercial art package such as *AMX Art* – the only requirement is that you end up with a screen that can be *LOADed back into screen memory. A second way to design a screen is to choose option 1 from the menu – the Pixel Editor.

The Pixel Editor (listing 2) was first presented by Mike Williams in the March issue of *AU* and is almost identical to the original. This can be used to create full graphics screens (in place of *Super Painter*, for example) though this is a long-winded approach. Its real purpose is to allow you to edit pictures in minute detail so you can shift points (ie, the flap of a wing) to create a sequence of screens which when run one after the other will give the impression of movement. Of course, you have to save each adjustment as a separate screen. For example, to animate a clock-face you might decide to show the movement hour by hour, in which case you would need 12 separate screens – one for each hour.

Listing 3 is the Full Screen Editor. Because the animation requires instant movement of memory, the actual animated area must remain small – 1k in fact or about a fifth of the screen width. (Restricting the screen size in this way allows us to load several frames into the computer at the same time.) However, 1k is quite enough for some super results.

The Full Screen Editor provides the means for you to define which part of your design it is that you wish to animate. Basically it throws a large square up onto the screen, which is the area capable of being displayed. You move this with the aid of the arrow keys until it bounds the area you wish to animate and save it as a separate file. This extraction process must be performed for each screen designed as described above. Thus, referring to the clock analogy, we would use the Full Screen Editor on each hour screen to save just the clock face for each hour position. These files are saved automatically under the filename ANIDTx where x is an incrementing value, ie, ANIDT1, ANIDT2, etc.

Getting the screen into the Full Screen Editor is done simply by typing the name of the screen after the prompt at the top of the screen; it will then be loaded in the normal



*LOAD fashion. Or, if you wish a blank screen to be loaded, press the Return key. The screenshot in figure 1 shows how the dotted box appears on the Einstein picture (also on the August disc), after having been moved over his right eye. Suppose we wish to use his right eye for some animation. Move the box cursor to the correct position and press S. The file will be saved as ANIDT1. If another area is now selected and saved it will be saved under the name ANIDT2 (as explained earlier, saving the file name is automatically incremented, but this is not so for loading). Pressing L will load in an ANIDTn file but here the current filename will appear on the top line. This filename can be changed by using the up and down cursor keys, ie, up increases the n of ANIDTn and down decreases it. Pressing L again will load the file. Note: the filename can be altered at any time by pressing F. The whole screen can be saved at any time by pressing A, (chosen because it is to the immediate right of S). Conversely the whole screen can be loaded by ;, (to the right of L).

A handy feature of the Data Editor is that by using the load ANIDTn facility, several copies of a frame may be loaded on to the same screen. This screen may be saved and the Pixel Editor used on each of the pictures. Thus different frames of the Mini-movie can be edited side-by-side.

The fourth listing is the Data Editor. This just prompts you with a series of questions which are used to determine how the moving picture is displayed. For example, 'How many pictures are there?' – for our clock analogy we will have designed 12, so 12 would be the reply (five were used for the Dodo). You will then be asked for two filenames. The first is the filename given to the final screen information, ie, the combined screens to be animated; the second is the name of the data block which will control the animation process. The dodo files use DODO and DODODO respectively!

You next have an option to change the colour palette before your moving picture is displayed. This is prompted in the form of VDU 19, n, where n is a number 0 to 3. For example, a black background 0, red feet 1, a yellow main body 3, white tail and wings 7, would give a dodo of the correct colours.

What order? is the next question. This allows you to define in which order the pictures are displayed, thus enabling small numbers of pictures to be shown in different sequences. Up to a maximum of 244 numbers can be entered. In the case of the dodo the order is 1, 2, 3, 4, 5, 4, 3, 2. If the wrong order is entered, answer N to the Y/N query at the end, otherwise the information is saved on disc and you are returned to the main menu.

The Combiner is listing 5. This takes all the previously created ANIDT files and combines them into one long file using the first filename specified above (DODO). You will be asked which picture you wish to start with – this will normally be the first one you designed (ie, 1) though it's up to you. After entering this information the files will be combined.

Listing 6, the Animator program, produces the moving picture display. When selected (option 5 on the menu) you will be prompted for a filename – this should be the second filename given in response to the Data Editor's questions (DODODO). The combined file is loaded and after a slight pause displayed.

Technical points

The animator screen is shrunk and moved around by manipulation of the 'horizontal timing registers' of the Cathode Ray Tube Controller (CRTC) chip. To shrink the screen, registers 1 (horizontal display) and 6 (vertical display) are altered, in this case to 16 and 8 respectively. To move the screen, registers 2 (horizontal sync position) and 7 (vertical sync position) are altered, here 70 and 25 respectively. The mode 1 screen that remains is just 1k in size and is mapped from &3000 to &3400.

When the Combiner is merging the ANIDT files it loads each of the files in turn and saves them to create one large file under the filename chosen in the Data Editor. The first picture is saved at &2900 and the rest are saved from &3400 onwards.

If more than one set of pictures has been drawn then the starting point specified when the Combiner is run could be at 1, 10 or even 90. This feature gives a degree of flexibility about the number of different picture sets which can be stored per disc surface, but remember, although the starting place is under your control, each picture is taken sequentially from there on.

If there are many files this process may take some time. In sequences which contain a lot of data, any data over the &3000 mark will be seen to be loaded into the screen due to the compacting process being carried out in mode 1. This provides a visual idea of how far the program has progressed.

Notes on use

When the moving picture is being displayed by the animator program its speed of movement may be varied by using the '+' and '−' keys to increase or decrease the speed respectively. In addition to this it is possible to move the whole screen (as the screen is compressed this is only the animation area) around the screen by using the cursor keys. A word of warning: as space is very limited in the animation program there is no room for checking for the edge of the screen. Trying to move the screen off the edge will result in some strange occurences! Experimenting with this on a monitor will allow the display to be recovered. Some televisions may have to be retuned.

Hints on using the programs

A scrolling background can be achieved by entering the Full Screen Editor and loading in a mode 1 screen. Move the cursor to the place at which you wish to start – save this area and move the cursor to one side and save again, repeating this until done.

The area enlarged by the Pixel Editor is only about a third of the total size displayed in the moving picture sequence. A grid has been incorporated for use on the main (non-editing) screen, which is divided into squares which are the same size as the animation area, and as such provides a reference on which the frame to be animated can be based. The grid can be toggled

on and off by pressing G. The grid should be disabled before pressing Return to get into pixel editing mode.

The order in which pictures are shown on the Data Editor can easily be changed. The simplest level for this is to run straight through from picture 1 to picture n, but more imaginative sequences are possible. A good example could involve a hand starting in the middle of the screen and waving from side to side, small oscillations at first but increasing with time. Such a display may consist of only nine or so pictures, but of 50 or more steps. Imagination makes a few pictures go a long way.

Compatibility

As mentioned at the start, the Moving Picture Program will work on a BBC model B, B+ and Master 128 computer, accompanied by a disc drive or linked to an Econet. The suite of programs will also work on machines fitted with ADFS. Because direct screen poking is used, the program will not work on a second processor or with shadow RAM enabled.

The program will not work on an Electron, as the CRTC is not fitted, or on a cassette-based system.

Because of the large amount of storage required by the Moving Picture Program, 80-track discs should be used wherever possible. If you have 40-track drives then several discs



Figure 1. Note the dotted box around right eye

will be needed – details can be found in the Test Run Section. Owners of dual 40-track drives could customise the programs to take advantage of the second drive.

What can you dodo?

If you think you can beat our dodo moving picture then we want to see it. In fact we want to see any animations you can do. Send your files on a disc to the *AU* office enclosing an sae if you want the disc back. We'll carry the best ones we receive on our monthly disc and in return you'll get a copy of the disc plus £20!

A test run

It really is a case of walk before you run with the Moving Picture Program. The software is complex, so the best place to start is with a very simple animated sequence and then gradually increase the complexity of your moving pictures as you gain experience and expertise. To help you along the way we have devised a simple 'Robotic Eye' sequence for you to work through step-by-step. If you're using a 40-track drive look at the comments enclosed by square brackets [ ] in the instructions.

If you're using an 80-track drive then all the operations can be performed on a single blank, formatted 80-track disc. [Because creating a moving picture will take more than 100k (the capacity of a 40-track disc), 40-track disc users will need at least two blank formatted discs. However, until you have mastered using the suite start with four discs – once finished, three can be reclaimed for future use.]

Onto your disc you should copy the five programs which make up the Moving Picture Program. You'll also find it more convenient to set up a boot file on your disc as follows:

```
*BUILD !BOOT
0001 *BASIC
0002 CHAIN"MENU"
0003 <Escape>
*OPT 4,3
```

Next save a dummy mode 1 screen on the same disc thus:

```
MODE 1
*SAVE WKFILE 3000 8000
```

PROGRAM DETAILS

The Full Screen Editor

PROCsedk	cursor keys
PROCsedd	draws large box cursor
PROCsdsv	load/save
PROCstor	transfers screen memory to store% and vice versa
PROCsvar	set variables
PROCflnm	increases or decreases filename
PROCmmov	memory move, transfers picture memory to image% and vice versa
PROCoscli	simulates the OSCLI command for Basic 1

The Animator

PROCmcode	machine code
PROCc	double height text
PROCw	produces window with 'drop shadow' effect

The variables

The Full Screen Editor

A%	general variable
F%	file number
J%	loop counter
A$, B$	general input/output
file$	current filename usually ANIDTn (where n is a number 1-99)
mode$	current mode, ie point, box, load/save
st%	screen start address changes with cursor movement
b$, e$	flags for REPEAT UNTIL loops
image%	used as a store for a 1k image
store%	used as a store for the top line of screen memory
oscli%	store for * commands

The Data Editor

npic%	number of pictures
col%(3)	the colour changes for the actual picture
L%	general variable
seq%	start of memory block containing frame display order
w	workspace for double height routine

The Combiner

n%	general variable
st%	determines at which filename combining should start
size$	holds the size of the combining file to be saved (in hexadecimal)
data%	memory block containing display details
b$	load address for individual frame

The Animator

ad%	address of the order of display data
de%	delay loop
np%	equivalent to npic% (reduced for reasons of space)
X%	value of horizontal sync position (register 2)
Y%	value of vertical sync position (register 1)
Z%	count to be added to ad%

Summary of keys

Pixel Editor

Cursor keys	move editing boxes around screen
Return	toggles between main and pixel editing screen
Copy	saves current screen
0	Sets pixel black
1	Sets pixel red
2	Sets pixel yellow
3	Sets pixel white

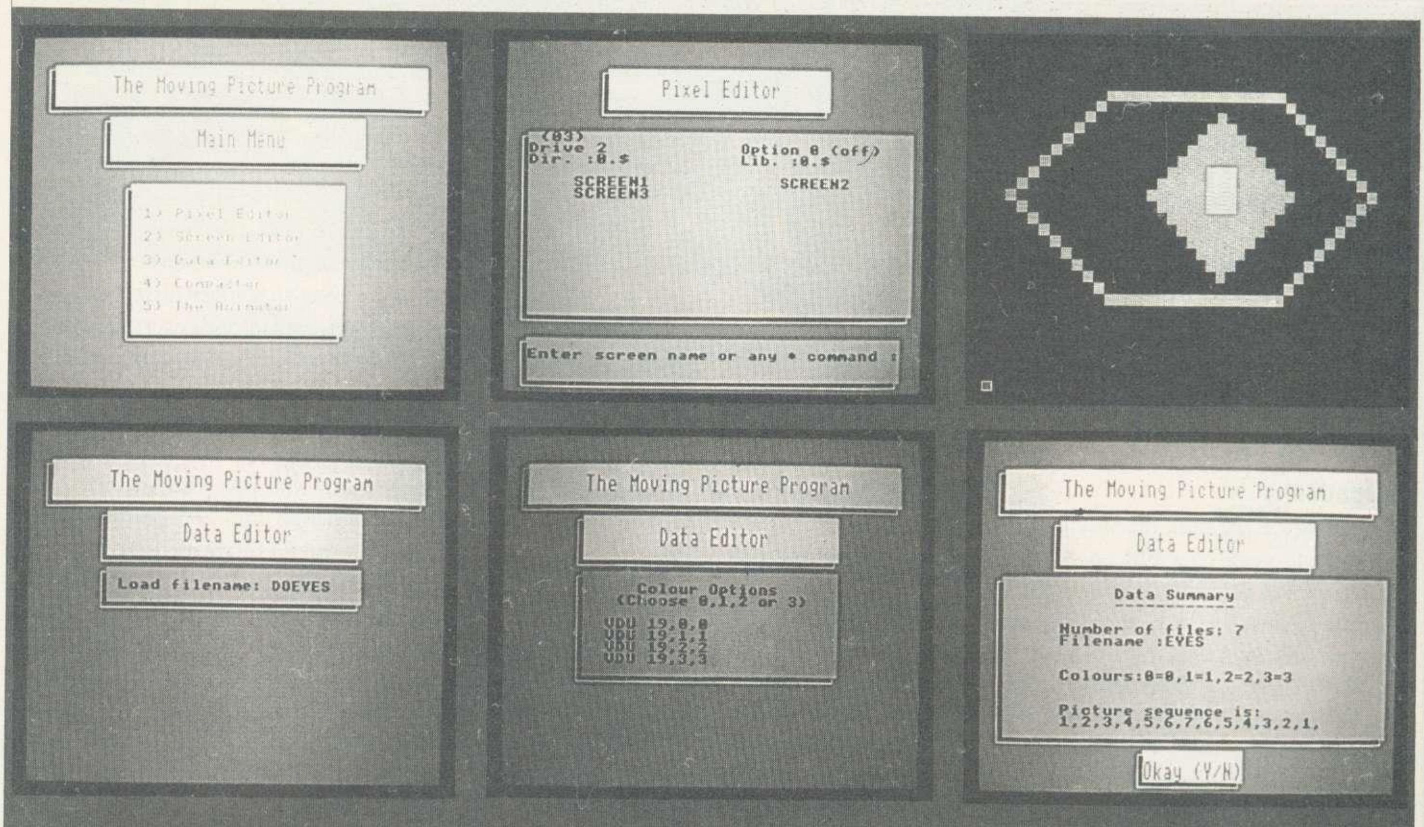
Full Screen Editor

Cursor keys	move large box cursor, increase/decrease file name
L	loads data
S	saves data
;	loads whole screen picture
A	saves whole screen picture
F	changes filename for data

The Animator

Cursor keys	move animation area around screen
+	increases speed of animation
–	decreases speed of animation

In all programs Escape returns to main menu.



The collection of pictures above illustrates some of the major areas of the Moving Picture Program's operation. From top left to right: Each sub-program is selected from the menu, the Pixel Editor provides you with a list of current files; inside the editor the robotic eye can be designed; the Data Editor requires information on filenames and colours to be used before finally checking your answers with you before creating the final completed picture file

[All 40-track disc-users should first label the main program disc. Take a second disc and copy the MENU, DATEDIT, COMBINE and ANIMATR programs onto this – label this disc MOVIE and label two other discs SCREEN1 and SCREEN2.]

Stage 1: the Pixel Editor

First boot the disc (ie, Shift-Break) to present the Moving Picture Program main menu, then select option 1 which is the Pixel Editor. This will load and present you with a catalogue of files on the disc and request a filename. Type the name of the dummy mode 1 screen WKFILE. The screen should clear and the dummy blank file (apart from the *SAVE command at the top of the screen) will be loaded in.

After a couple of seconds a small rectangular box will appear in the bottom left-hand corner of the screen – this is the editing box, the contents of which will be magnified to fit the entire screen, enabling you to edit individual picture elements – pixels.

. The size of this box is set according to the amount of free memory available and so may vary between different machines.

Using the up and right arrow keys moves the box to about centre on the screen (pressing Shift as well speeds it up). Now press the Return key – your disc drive should come into operation as information is saved to the disc. Then nothing will appear to happen! But wait, and after about 10 seconds you will notice that the test at the top of the screen is being wiped out – the magnifying process is taking place. The small blank area of screen is being enlarged into a big area of blank screen! This whole process will take about 20 seconds and is complete when a small rectangular box appears in the bottom left-hand corner of the screen – this is your editing cursor.

Figure 2 shows the design we are going to create. As you can see there is an imaginary number grid around the figure which relates to cursor movements on screen – more on this in a moment.

First, set a marker pixel at the point where the cursor is. To do this press the 1 key and a small red square will appear – this will allow us to align our pictures in stage 2.

The arrow keys control the pixel cursor's movement while colours are obtained with the following keys: 1 = red, 2 = yellow, 3 = white, 4 = black. Now move the pixel cursor to point to 1 (figure 2). This is done by moving 19 places up and seven to the right. Using the grid as a guide, design the eye on the screen.

When you are satisfied with this, press the Return key – the disc will come to life once more and the original WKFILE screen will be re-loaded and your newly-created design will be drawn onto this. This editing process may be repeated as many times as is necessary. We now need to save this new screen. Do this by pressing the Copy key. You will be asked for the name under which your screen will be saved. Enter the name (eg, EYE1) and press Return and the screen will be saved. (Note that the screen is saved as WKFILE before the name is requested and the file is appropriately renamed afterwards.)

[40-track disc users should insert the SCREEN1 disc before saving the screen.]

We need to produce another six eye screens, each one with the pupil moved slightly to the left of the preceding one. This is easy to do as we can simply edit the previously saved eye. For example, to do EYE2, re-enter the Pixel Editor, this time selecting EYE1 as the file to load. When the rectangular box appears, move this over the eye so that the small red marker pixel sits at the bottom left-hand corner, and press Return to display the magnified eye. Now you can simply re-edit the pupil moving it two pixels to the left. Press Return and Copy and save the file as EYE2. Repeat the whole process until you have seven eyes on disc called EYE1 to EYE7 inclusive. [40 track disc users will only have enough room for four screens

(EYE1 to EYE4) on the SCREEN1 disc; files EYE5 to EYE7 should be copied to the SCREEN2 disc.]

Stage 2: the Full Screen Editor

The next stage is to translate the seven EYE screens into files that can be handled by the Animator program – this is done with the Full Screen Editor, so load this by selecting option 2 on the main menu.

The screen will clear and a message will ask you for the name of the file to be loaded. Type EYE1 and press Return.

After the file is loaded a large square box will appear at the top left corner of the screen – this can be moved with the arrow keys. Position this so that its bottom left corner sits as near as possible to the small red marker pixel (note that you may need to go one side or the other of it if you cannot sit the corner of the box exactly on it – this is okay but be consistent how you do this when you load in subsequent EYE files).

The box encloses the area that will form the final moving picture. This must be saved – to do this press the S key and the boxed area will be saved as a file called ANIDT1. [40-track disc users should swap their current SCREEN disc with the MOVIE disc before saving the ANIDT1 files.]

This has to be done with each of the EYE files in turn. However, after EYE1, a slight change must be made. Press A and enter EYE2 to load the next EYE screen. Move the box to locate on the marker pixel as already described. The filename will have been changed automatically to ANIDT2. The filename used in saving can be changed at any time. To do this press the F key. The current filename will be displayed at the top left of the screen. The numeric part of the filename can be increased (or decreased) using the up (or down) arrow keys. Press up arrow so that the file name says ANIDT2. Press the S key to select the filename displayed, and press the S key again to save the boxed area as a file. This process must be carried out for each EYE file, with the EYE3, EYE4, EYE5, EYE6 and EYE7 files being saved as ANIDT3, ANIDT4, ANIDT5, ANIDT6 and ANIDT7 respectively.

[Note: 40-track users must remember to swap discs as required. Remember the MAIN disc will be required to load the Menu and Full Screen Editor programs. The SCREEN1 or SCREEN2 disc should then be inserted to allow the correct EYE file to be loaded. Once loaded, the MOVIE disc should be inserted; once the ANIDT file has been saved, the MAIN disc should be re-inserted before pressing Escape to return to the main menu.

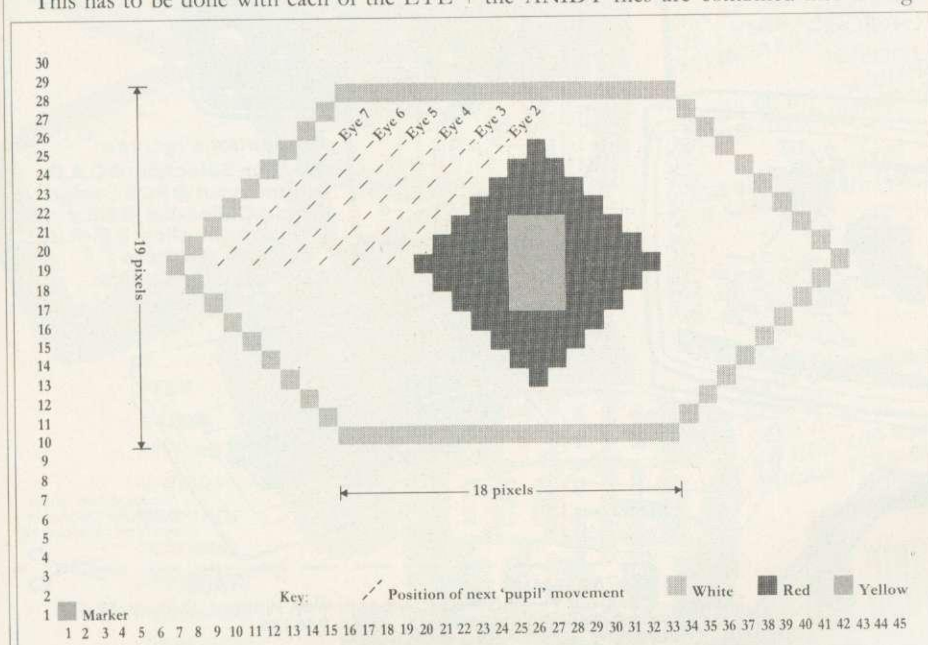


Figure 2. The robotic eye – use the grid as a guide to help you design it on screen, then animate it

Stage 3: the Data Editor

[At this stage 40-track users should insert the MOVIE disc and chain the Menu program.]

Select option 3 on the menu. You will then be asked a series of questions. The first is 'how many pictures?'. The answer is seven (ANIDT1 to ANIDT7). The next request is for you to enter a filename to be used when all the ANIDT files are combined into a single large file – choose something relevant, eg, EYES. The next question is asking you to enter another filename, which will be used to animate the entire sequence of moving pictures, again something relevant – DOEYES is a good filename to enter here. You are then requested to enter VDU 19 codes – this gives you a chance to define the four colours used on the mode 1 screen. For the time being there is no need to alter these (though you might like to experiment later) so just reply with a 0, 1, 2, and 3 to each of the four prompts as follows:

VDU 19,0,
VDU 19,1,
VDU 19,2,
VDU 19,3,

The final question asked is the order in which you wish your pictures to be displayed. As we wish to move the eye from right to left and back right again the sequence is: 1,2,3,4,5,6,7,8,5,4,3,2. So reply with each number in turn to each picture number requested, pressing Return after each, and Return on its own to complete the final entry. All the information entered will be displayed for you to check – if you are happy, press the Y key; press N to start this stage again.

Stage 4: the Combiner

The main menu will be re-entered. The process of combining several ANIDT files into one long file must now take place with the aid of the Combiner – so select option 4. The Combiner makes two requests: first enter the loader filename (eg, DOEYES); then enter the number of the starting picture. This is picture 1 – after this the disc will come to life and the file EYES will be created. On completion you are returned to the main menu.

Stage 5: the Animator

The moving picture has now been created and is ready for display. To do this select option 5 from the main menu. You will be asked for a filename, so type DOEYES. The screen will then clear and the disc will be accessed. After a few seconds wait while the moving picture is set up, it will be displayed.

Your 80-track disc will now be pretty full. If you do not wish to make any future modifications to your moving picture the ANIDT files can be deleted. It's advisable to keep the EYE files as it is probable that you have put a lot of work into these and may wish to use them again at a later stage. Of course you can build up a MOVIE disc onto which you can copy your moving picture programs. To do this each picture requires two files – for example EYES and DOEYES.

[40-track disc users can delete files as described above. If you wish to keep your graphic screens you could use the screen compression program presented in the February issue of *AU*. This will allow you to keep more screens on a single disc, thereby freeing more discs for use. It's possible to compile MOVIE discs as outlined above.]

See the index to yellow pages on page 121 for details of where to find the Moving Picture Program listings

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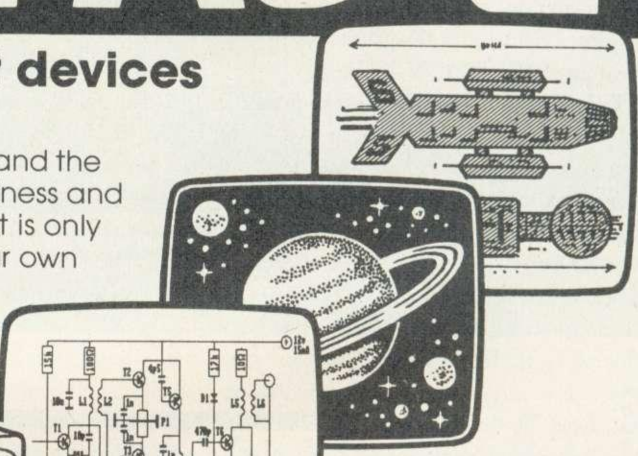
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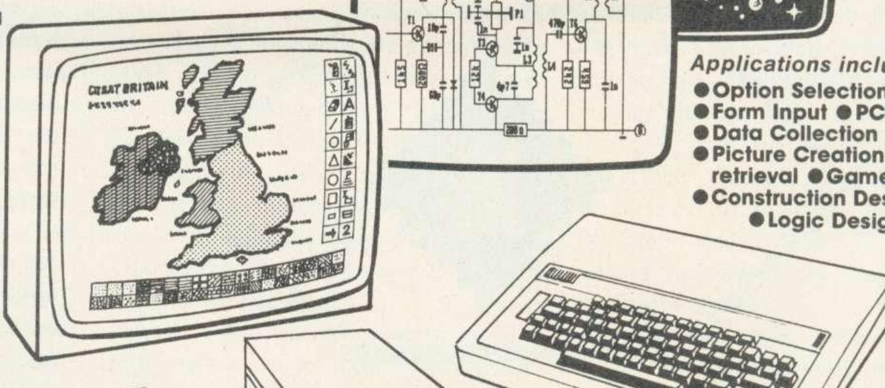
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SPECIFICATIONS

Resolution 1280 × 1024 pixels	**Output rate** 2000 co-ordinate pairs per second	**Origin** Left-hand corner or selectable
Repeatability 1 pixel	**Interface** Parallel	**Dimensions** 350 × 260 × 12mm


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THE SLICK SLIDE SHOW

Whether you want a lively slide presentation to entertain friends or to impress at the office, here's the professional-looking solution

Paul Rodgers

Have you ever wanted to present your holiday slides with a professional flourish? Wished you could make impressive title slides? Perhaps you think that many hours of careful work on a drawing board, or even expensive professional help are necessary. If you own a BBC micro think again! You have the perfect answer, as the following illustrations demonstrate. Listings are not given because hidden control codes in mode 7 screens make copying difficult. I suggest you make use of a good teletext editor program – Beebugsoft has one called *Teletext Pack* which has some unique features.



This simple title slide was quickly created with Beebugsoft's *Teletext Pack* teletext editor in mode 7

Technical restrictions

Most errors in slide-making stem from the mistaken idea that legibility in one form must mean legibility in another. A glance at figure 1 will give an idea of the relative scales of text and screen. Colour is important for projected legibility, for example, yellow gives better contrast than blue.

Watch the following points:

- Use a dark background where possible.
- Limit each slide to one main idea.
- Keep titles to a maximum of seven words, restrict text to 15-20 words or 25-30 figures.
- Use a series of slides to disclose information progressively.
- Finish your show with an 'end' slide on a black background, not an eye-shattering blank white screen.

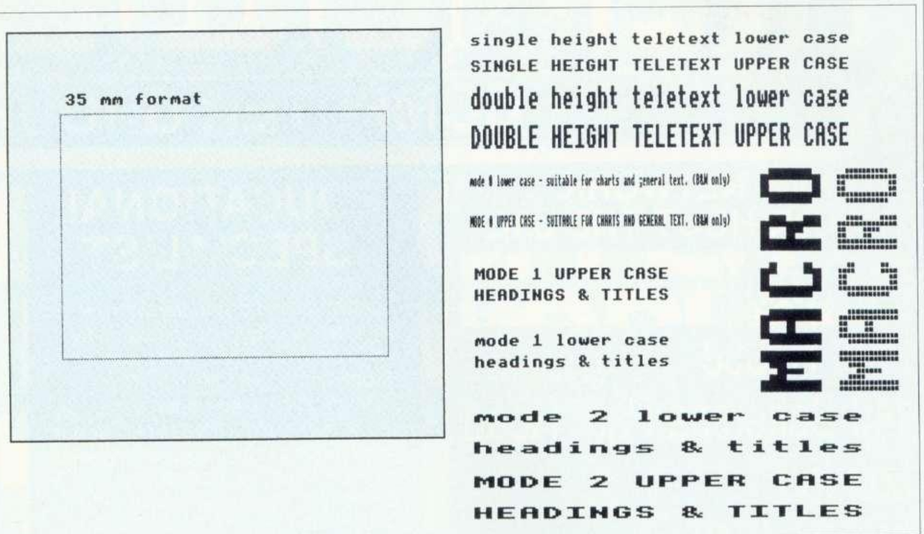
The image on a monitor or TV screen judders up and down slightly and for normal viewing this is acceptable. To the photographer, however, this interlace presents potentially serious problems of definition (see Robin Mudge's article on page 163). To stop the interlace on all but mode 7 screens, place the *TV0,1 command before the mode command. The first parameter, 0, has no effect on the screen. The second parameter, 1, switches off the interlace. *TV255,1 will make the screen move down one line, while *TV1,1 will raise the screen one line. These minor adjustments are useful if your picture is slightly off-centre.

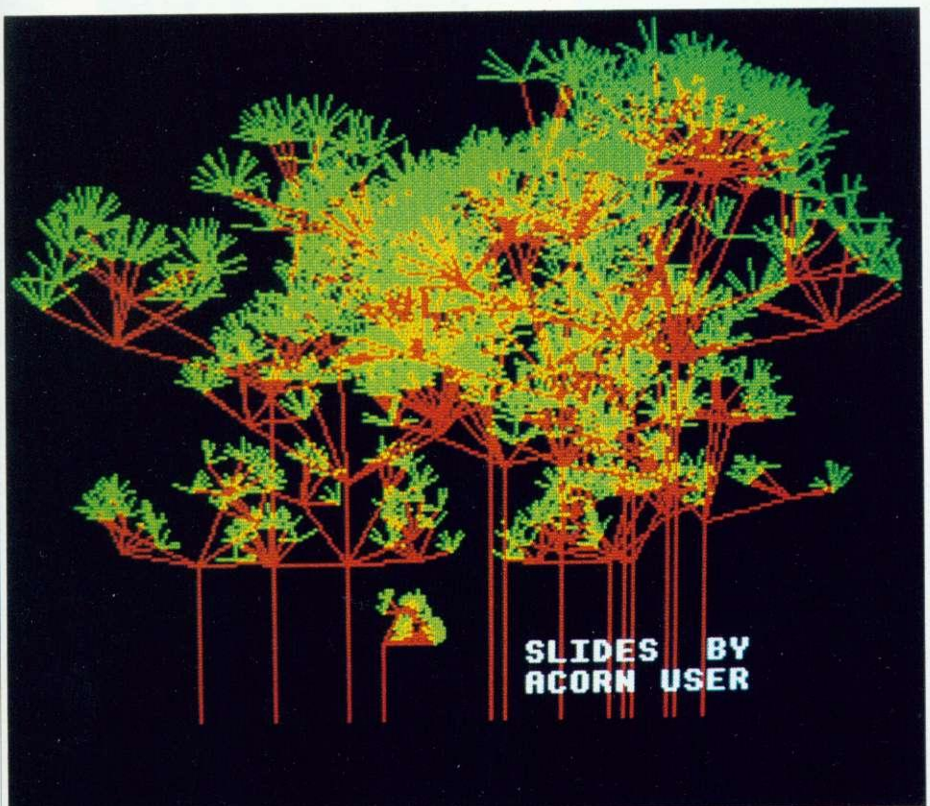
The interlace cannot be turned off in mode 7 because the teletext display is generated by a separate chip – the SA5050 – which is designed specifically for televisions, whereas the other modes are generated purely by the 6845 controller intended for use with monitors and/or TVs of any standard, worldwide. It is quite likely, however, that you will want to use mode 7 for its chunky effects rather than fine definition, and in that case the interlace can sometimes be an advantage. On a screen



Single- and double-height lettering gives contrast

Figure 1. The inner rectangle (right) represents the recommended limits of your text on-screen drawn to the same scale as the samples of text on the far right (not shown full size). The absolute maximum area is shown by the outer rectangle, but if you use long lines of text here it may be slightly distorted, so it is best to fill this with a background colour





You can tie graphics into the subject of your talk with great effectiveness – but use them sparingly

designed for photography, the flashing text cursor will be a nuisance. It can be turned off with VDU 23;8202;0;0;0;

Films and exposure

For most purposes, any good colour reversal film of about 100 ASA will be satisfactory. If you want to be adventurous, try Kodak Photomicrography Colour Film 2483, which has very high contrast and colour saturation. With an ASA speed of only 16 it is slow, but this hardly matters. It does mean, however, that test exposures become vital. If you stick to 100 ASA film, an exposure of half a second at f4 will be about right for most screens with black backgrounds. Use a cable release and watch out for reflections on the screen. When using 55mm or shorter focal length lenses, there is a tendency to produce distortion on some slides which is not apparent on the image as seen through the viewfinder. While the centre line of the screen is being photographed straight on, the sides are being photographed at rather an oblique angle, accentuated by the curvature of the screen itself. Long horizontal rows of text near the top or bottom of the screen tend to become distorted. In such cases, either keep your text within the suggested 35mm film format – 24 × 36 – (figure 1), or alternatively use a longer focal length lens. The former option is much safer.

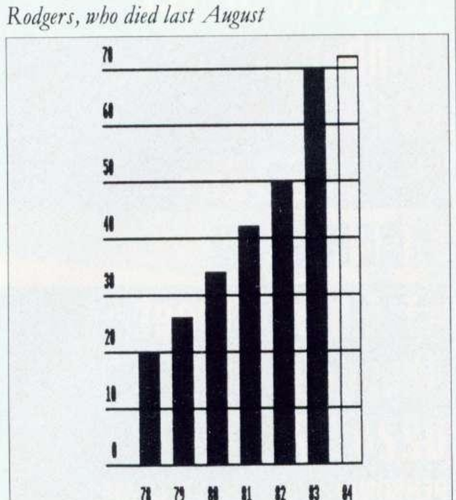
All modes have their own characteristics, but I find that virtually all normal requirements can be met in modes 1 or 7. Memory is rarely a problem in screen photography.

Occasionally, for black-and-white work, mode 0 is useful for charts and figures.

Layout

The printed screen illustrations are for identification purposes only, as colour plays such an important part in the projected image. Also, there are physical differences between mode 7 text on screen and as printed. I find a useful aid to accurate layout on screen is to stick small pieces of white tape on the monitor casing as centre lines and as markers for the boundaries of the 35mm 'safe' area. This speeds up layout design and ensures that when photographing a series of screens you are not faced with constantly adjusting the camera position. Owners of a *Printmaster* ROM wishing to print a mode 0 screen centrally on the sheet can use the command *GDUMP 0 0 1 2 30. The examples in figure 1 clearly show how text in different modes relates to the screen area.

Acorn User *wishes to extend its sympathy to the widow, family and friends of the author, the late Paul Rodgers, who died last August*



Mode 0 is useful for clear black-and-white charts

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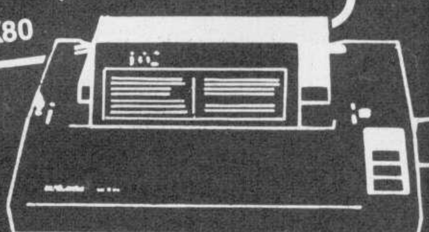
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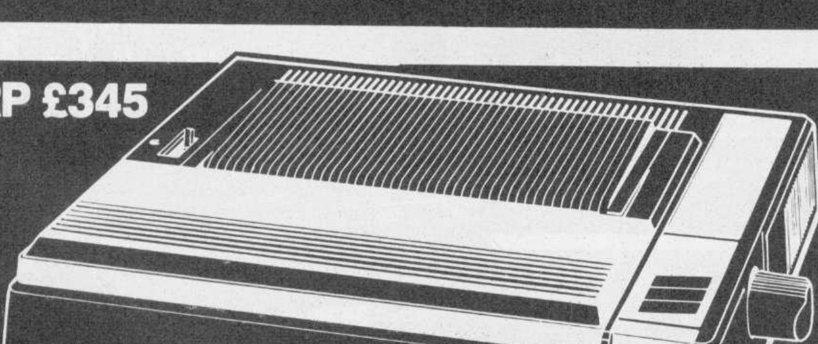
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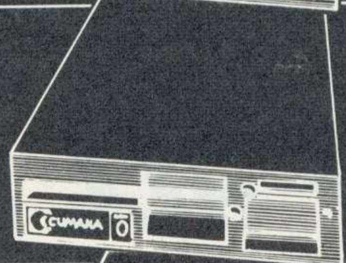
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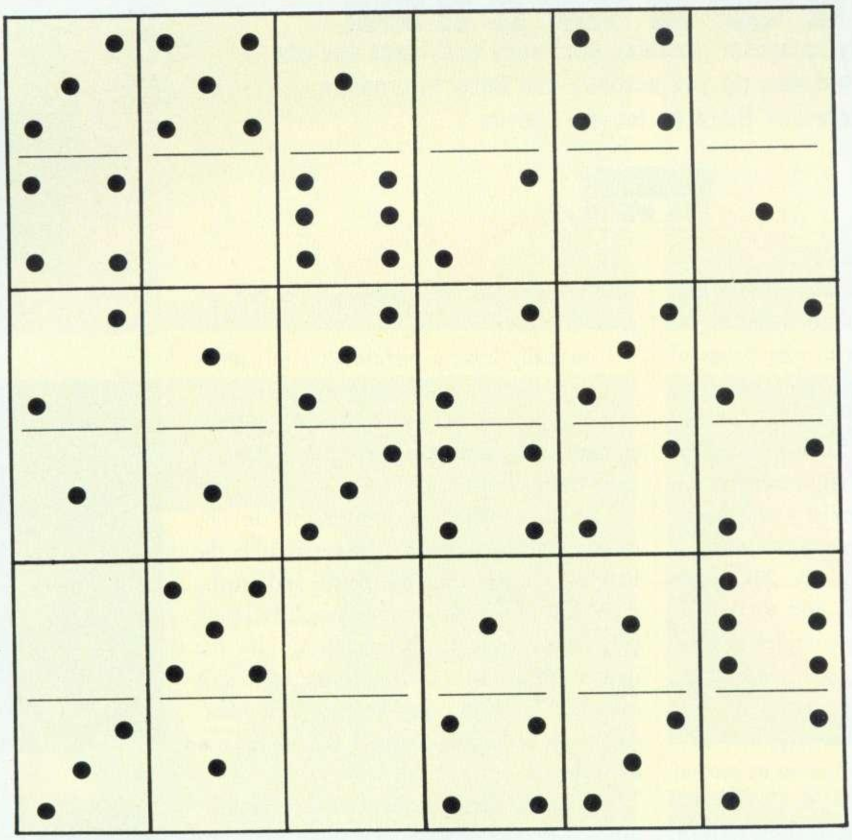
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COMPETITION

25 BBC MONITOR ROMS TO BE WON

Here's a brainteaser that will send you dotty – but it all adds up to a great chance to win some super software

Simon Dally



The illustration above shows a square consisting of 18 dominoes taken from a standard set. They are arranged so that each of the six horizontal rows and vertical columns, and the two main diagonals, adds up to 13.

This is the smallest summation possible with this format.

Your task for this month's competition is to arrange any 18 dominoes from a standard set in the same form, but so that the total of the pips in each of the rows, columns and diagonals exactly equals 18.

Note: a standard set of dominoes consists of 28 tiles running from 6:6, 6:5, 6:4, 6:3, 6:2, 6:1, 6:-, 5:5, 5:4, 5:3, 5:2, 5:1, 5:-, etc down to -:- (the double blank).

Send your answers (plus the coupon, right) on a postcard or back of an envelope (no letters, please) to August Competition, *Acorn User*, Redwood Publishing, 141-3 Drury Lane, London WC2B 5TF. Entries should arrive at the office not later than August 22.



BBC Soft's *Monitor* ROM in action

Win a BBC Monitor ROM

The first 25 correct entries out of the hat will win a BBC Soft *Monitor* ROM, written by Graham Bartram (see the review on page 147 of this issue). It costs £39.95 and works on the BBC B, B+ and Master, allowing even the beginner to write and debug machine code programs. Its extensive facilities will also keep the most advanced programmer happy.

For Electron owners, we're offering *Toolbox II* (book and tape) by Ian Trackman, priced at £21.90 as well as *Word Mover* (£9.95), both from BBC Soft. Remember to specify which micro you have on your competition entry!

ACORN USER
COMPETITION
AUGUST

PUTTING YOU IN THE PICTURE

There are many computer graphics packages and input devices available, but how do you actually use them to produce pictures? Read on for the answer . . .

Phil Wilkes

As a Beeb-owner interested in graphics I have combined many of the programs carried in past issues of *Acorn User* into one bumper package to fulfil my requirements. It is called *Artist* and includes Peter Sandford's colour and pattern fills, a George Hill printer dump and my own pixel editor, similar to the one by Mike Williams which was recently featured.

The program works in any 20k mode (modes 0, 1 and 2) and uses disc overlays to access all the code. It is mainly written in Basic but with several machine code subroutines, and it will accept keyboard, joystick and AMX Mouse input. I have been revising it since I bought my micro, and it is now in its second major incarnation.

I usually produce pictures in three distinct phases, although I am not too rigid about this. Some subjects require other approaches to achieve a different 'feel', I find mode 1 gives the best compromise between resolution and colour. I now almost exclusively use AMX *SuperArt* plus my own *Artist* program and work on a full-size screen. I prefer using the mouse to a joystick because it gives more precise control and has a more natural feel to it.

The first phase is simple line drawing, most often in black on white. This need only cover the main objects in the picture and does not need to be in great detail. It must, however, be fairly precise, as it serves to get the composition of the picture right and establish the size and shape of the main objects. The functions most used at this stage are rubber-band line drawing and continuous line drawing. I consider this stage to be the most crucial to the final picture. Mistakes made now are difficult to correct later.

I normally leave a picture after this phase and come back to it after a day or two to look at it afresh. This will usually reveal any badly proportioned sections and it is not difficult to erase and redraw them.

The second phase is colouring in the line drawing with pattern fills. This establishes the basic colour balance in the picture and usually takes only a few minutes to complete. Using patterns in mode 1, it's possible to give the impression of many more than the basic four colours. It's worth experimenting with different colour definitions to match the subject you have chosen.

Adding the detail to the picture is the final phase. Airbrush and spray facilities come into their own here, and this is where the AMX *SuperArt* program excels. Zoom, or pixel editing, is also very useful for fine detail – especially for getting faces correct.

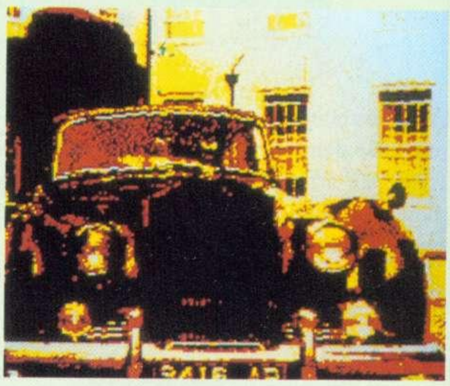
Although the results achieved can be very good, the BBC micro is limited in resolution and choice of colours, so it's best to choose your subjects with care. I have found that solitary, bold subjects are the most successful. Scenes which are too busy or subjects which rely on subtle colours tend not to come across too well.

I hope these notes will be useful to other computer artists. Above all, it's important to experiment with different techniques to find how to achieve the effects you want. There is a lot of good software available and it's usually possible to transfer pictures between the different packages to get the best from them all.

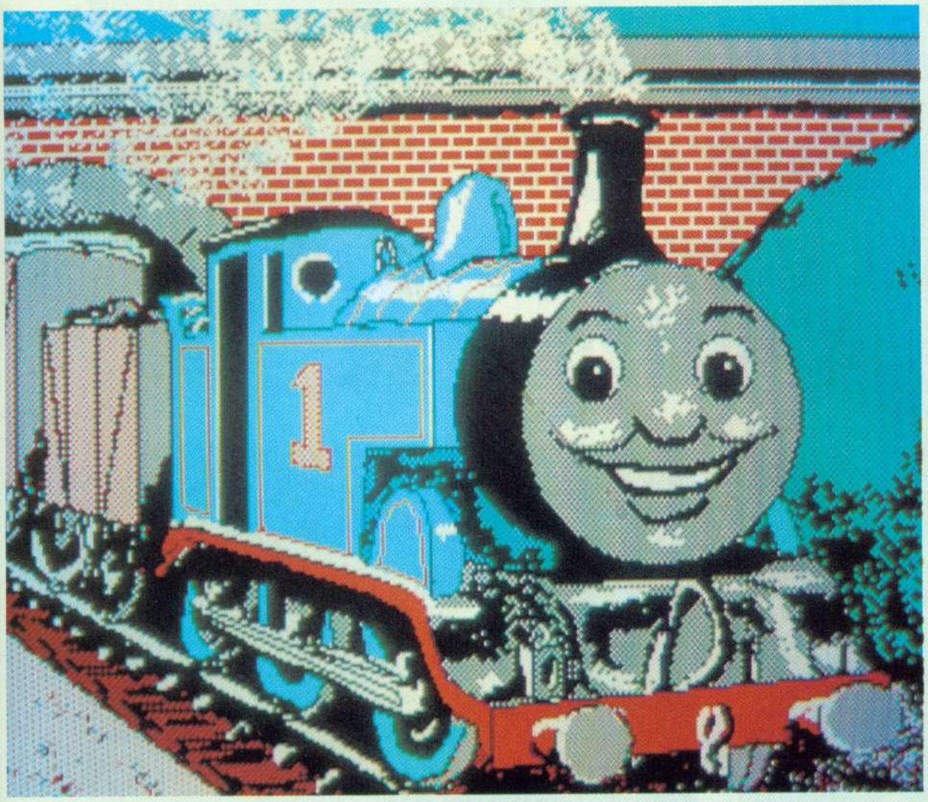






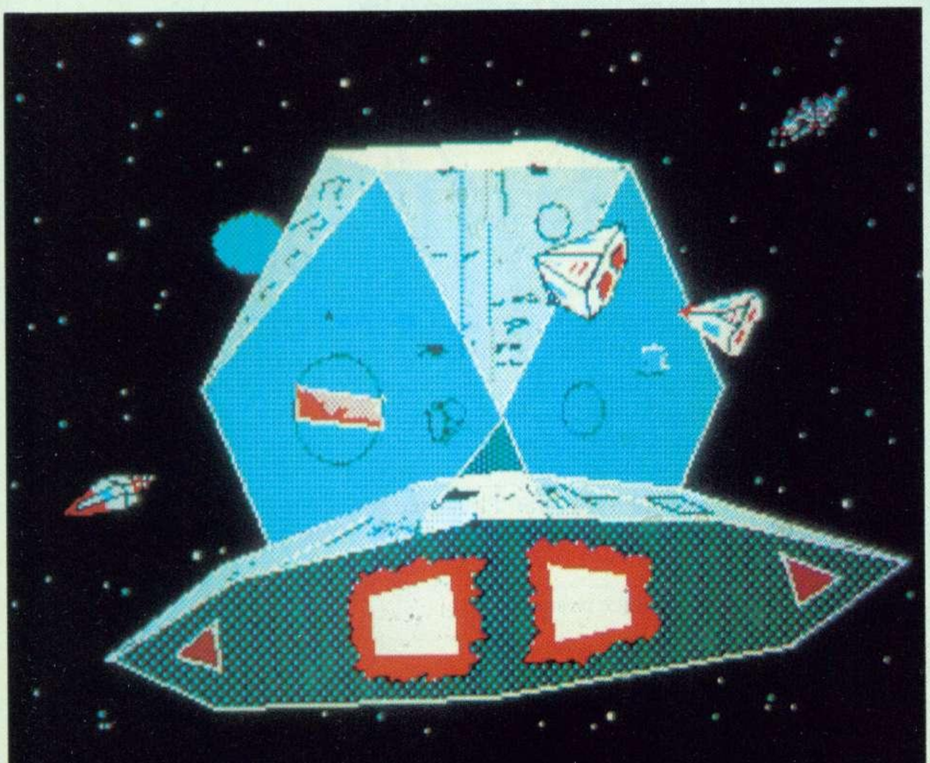


These screens were devised using a video digitiser. The close-up of film star Raquel Welch (top) and of classic comedian Tony Hancock are both featured on our special Gallery Disc (see page 119 for how to order your copy). The Hancock screen was also the graphics bonus featured on the July listings disc











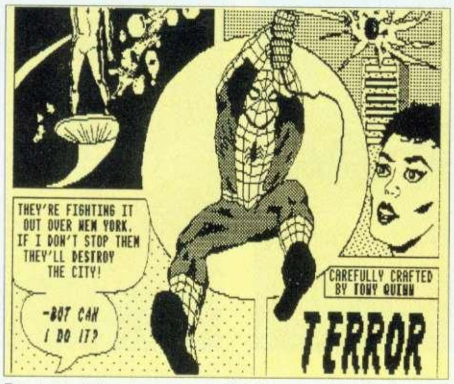


Phil Wilkes used his Artist program to create all these pictures which are featured on the Acorn User Gallery Disc (see page 119) – and Thomas the Tank Engine is the graphics bonus on the August listings disc (page 117). The fine details on the ship and Henry VIII were added using a pixel editor – compare these to the Ghostbusters' logo for confirmation of the advice that bold subjects are best. The Beeb's limitations in drawing circles can be seen in the jagged edges of Thomas the Tank Engine's face

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You can see some of these graphics screens pictured above. The discs are supplied in 5.25in 40-track format, and conversion instructions are included for 80-track disc users.

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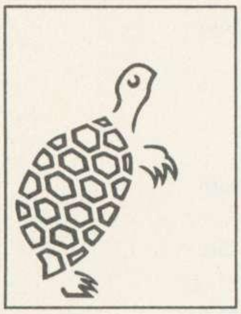
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BROM+ from Clares is one of the best and most popular toolkit ROMs around, and here's your chance to invest in one at an extra special price – you'll save £4.50 on the ROM and £4 on the disc version. *BROM+* adds a host of extra commands to your micro to make your life easier . . . and what a lifesaver when the dreaded disc errors crop up!

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All these commands are presented on a simple, easy to use scrolling screen display. Take a look at the review by Simon Williams in the June issue if you want to know more. Here's a list with brief descriptions of some of the commands:

- EDIT – a full screen editor, not to be confused with the line editor used in other toolkit ROMs.
- ERROR ON – will trap errors and enter the editor.
- FIND all occurences of a string or keyword and enter the editor, TAB will find the next one and so on.
- SCHANGE a search and replace facility.
- LCOPY and LMOVE allow you to copy and move lines.
- PACK is a very powerful routine which removes REMs and spaces and forms multi-statement lines in an intelligent way.
- RENUM is a partial renumber facility.
- XREF allows you to cross reference your program.
- COMPARE a file against memory.
- DFIND to search a disc for a string.
- DGET/DPUT to load or save sectors.
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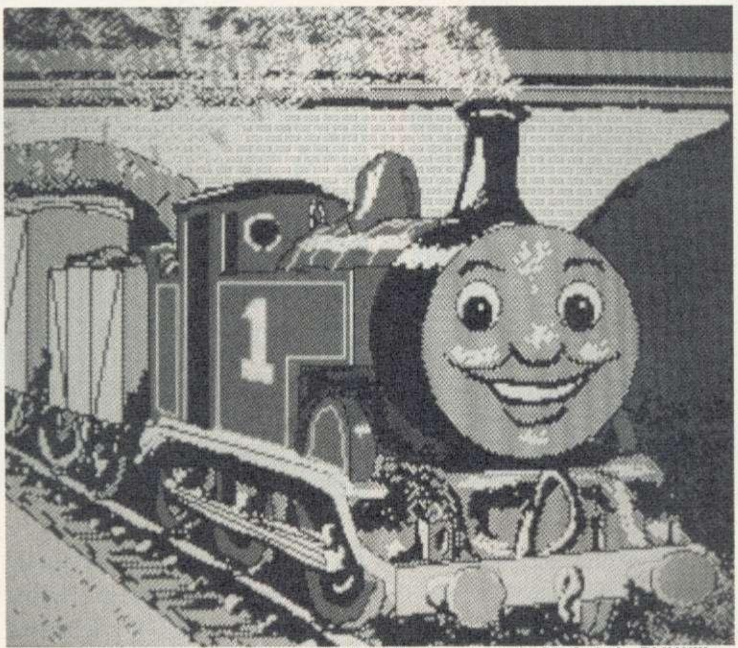
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ACORN USER OFFER

August listings on cassette £3.75 or disc £5.75



The graphics bonus on disc is Thomas the Tank Engine, created with *Artist* by Phil Wilkes

See the Dodo fly – that's our mouthwatering temptation for you this month as picture files come to life, and at £5.75 for the disc, it's a snip. Of course, the whole suite of Moving Picture Programs are also present, along with the decorating genius of Joe Telford's interior design program – get the layout for a room right before you buy the furniture!

As always a graphics bonus is present on the disc – Thomas the Tank Engine, shown above – plus a new exciting front end to our disc.

The disc-less among you can obtain all the programs from this issue on a quality cassette tape for just £3.75.

And Electron owners don't forget that the monthly disc is fully compatible with the Advanced Plus 4, while side two of the tape contains the Electron versions of the programs.

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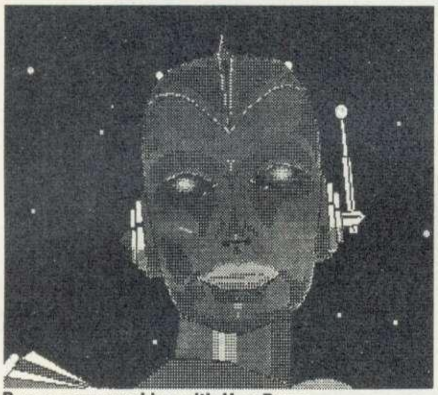
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ROMS

ACORN USER OFFER

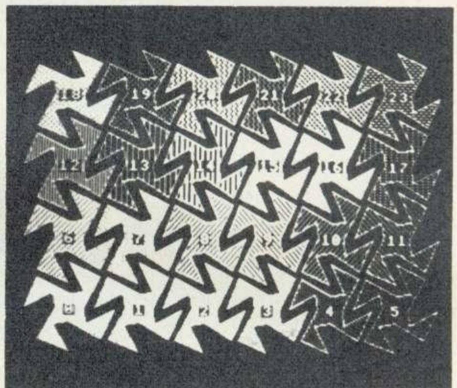
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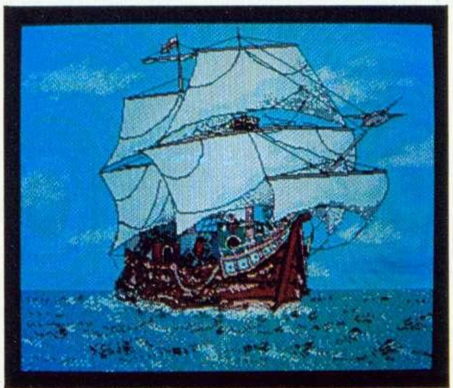
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HA9

SPECIAL DISCS

ACORN USER OFFER

A gallery of pictures



This galley is just one of *Gallery's* scrolling screens

The *Acorn User Gallery* disc has been a feature at past Acorn User Exhibitions over the years, so by popular demand we are now pleased to offer it to our readers. It's an automatic scrolling display of over 25 stunning graphics screens, and the disc also includes the ever-popular *Super Painter* and *Pixel Editor* to allow you to alter and edit the pictures if you wish, or just add your own. A special screen compaction routine has enabled us to squeeze over 500k of screen images into less than 200k. The expansion program is also present on the disc so that you can reload individual screens.

You can marvel at Spiderman, see the Coke can come alive, plus robotic Brilliance, Astronaut, Elite, Wimp Fashions, Max Headroom, Sunrise, Thomas the Tank Engine and many more screens.

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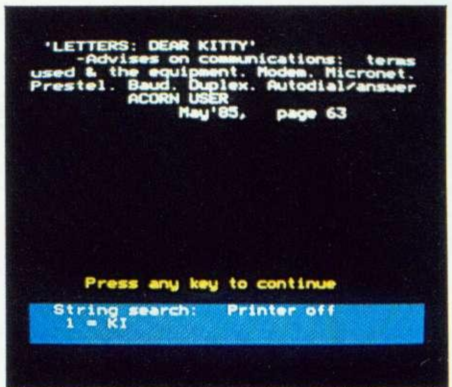
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If you've ever spent hours looking through your copies of *Acorn User* for an elusive article you know you've seen but can't remember when or where, then what you need is the *Acorn User Bibliography* to save you time and trouble!

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You'll even find reference to reader's letters and every news item we've carried!

The *Acorn User Bibliography* is sold in parts, in a specially enhanced format, which will make your searches faster, taking about 15 seconds on the 40-track disc and 40 seconds on the 80-track disc. Location of a reference is by one or two string searching and the user may specify the starting month and year.

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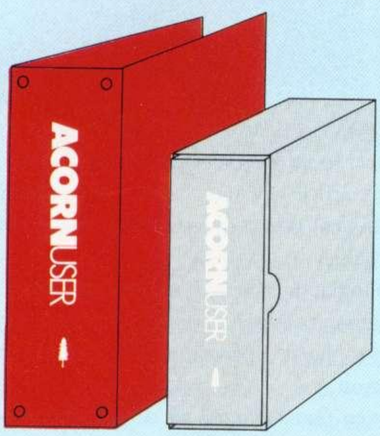
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YELLOW PAGES

INDEX/COMPATIBILITY

Entering listings

To make the task of entering listings easier, *Acorn User* has adopted several standards in the Yellow Pages. Programs are listed with line numbers in increments of 10, so type AUTO <Return> for automatic line numbering before you start. Before you list what you've entered, type LISTO 1 <Return> to provide spaces after the line numbers. Programs in the Yellow Pages are usually listed to a width of 40 characters, so type MODE 6 <Return> before you start. Comparing the line-endings of your listing with the Yellow Pages will help you spot extra or missing characters.

To make sure that the program you want to enter will work on your particular machine, check the index below. All the listings work with Basic 1, 2 and 4 (unless stated otherwise) and with operating system OS1.2 or above. If a program is accompanied by an article, please read the article first. If special care is needed when entering a listing, we provide a 'How to Enter' box.

Once you've typed in your program, save it to tape or disc then test it by running it. If you've made a mistake, an error message will probably appear, telling you which line contains the error. List the line and check it carefully against the published version.

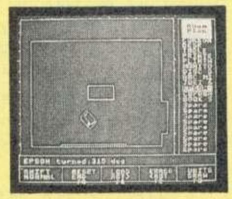
If the line is the start of a procedure definition – eg, 1000 DEF PROCfred – the error may be at another line which calls the procedure. For further help with debugging, refer to First Byte in the April 1986 issue.

HINTS AND TIPS



122
Programs to change the size of the screen cursor and to allow double-height input. See Hints & Tips on page 57

ROOM FOR IMPROVEMENT



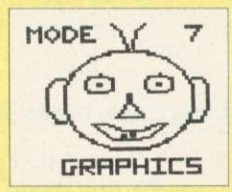
123
Use your micro to plan a kitchen or bathroom, courtesy of interior designer Joe Telford, who explains all on page 89

DODO IT YOURSELF



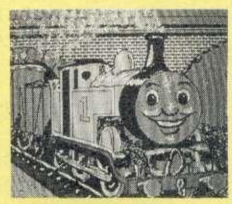
131
Walt Disney rolls in his grave as Michael Sherratt and Bruce Smith get animated. Feature: page 96

PICTURES IN PRINT



136
A program to put the Integrex Colour-Jet 132 printer through its paces: see Ron Fox's review on page 154

DISCS AND TAPES



136
Our monthly listings disc always has a graphics bonus – like Thomas the Tank Engine (right). See pages 114 and 117

Program		Page	BBC B	BBC B+/128k	BBC with ADFS	Shadow RAM	Electron	Electron with Plus 1	Electron with Plus 1 and Plus 3	Master 128	Master 128 with ADFS	6502SP	Econet	Monthly cassette & disc
Hints & Tips	Listing 1	122	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Listing 2	122	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y
	Listing 3	122	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
First Byte	Listing 1	122	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y (a)
Interior Design	Listing 1	123	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Listing 2	124	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Listing 3	125	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Listing 4	126	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Listing 5	129	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Moving Pictures	Listing 1	131	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	Y (a)
	Listing 2	132	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	Y (a)
	Listing 3	133	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	Y (a)
	Listing 4	134	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	Y (a)
	Listing 5	135	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	Y (a)
	Listing 6	135	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	Y (a)
Integrex Test	Listing 1	136	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y

(a) Switch off shadow RAM if using B+/Master 128

YELLOW PAGES
HINTS & TIPS

See Hints & Tips, page 57

Listing 1. Allows various cursors to be displayed. NB: WIDTH = 41

```
   10 REM Hints & Tips - listing 1
   20 REM Redefine Cursor
   30 REM by Martin Phillips
   40 REM for BBC B/B+/E/M
   50 REM (c) Acorn User August 1986
   60 :
   70 CLS
   80 ON ERROR RUN
   90 INPUT"Mode? "M%
  100 IF M%<0 OR M%>7 GOTO 90
  110 PRINT"O .. off"
  120 PRINT"F .. fast"
  130 PRINT"S .. slow"
  140 INPUT"Select flash rate: "A$
  150 IF INSTR("OFS",A$)=0 GOTO 140
  160 IF A$= "O" THEN rate=0
  170 IF A$= "F" THEN rate=64
  180 IF A$= "S" THEN rate=96
  190 MODE M%
  200 range=8
  210 IF M% MOD 3=0 THEN range=10
  220 IF M%=7 THEN range=20
  230 REPEAT
  240 CLS
  250 PRINT"Press ESCAPE to change mode."
  260 PRINT'"Cursor start (0-";range;
  270 INPUT") "start
  280 IF start<0 OR start>range CLS:GOTO
 250
  290 VDU 23,0,10,rate+start,0;0;0;0;
  300 UNTIL FALSE
```

Listing 2. Mode 7 double height character input routine

```
   10 REM Hints & Tips - listing 2
   20 REM Mode 7 double-height input
   30 REM by Martin Phillips
   40 REM for BBC B/B+/M
   50 REM (c) Acorn User August 1986
   60 :
   70 MODE 7
   80 VDU 23;8202;0;0;0;
   90 name$=""
  100 ask$=CHR$130+"Name please"+CHR$133
  110 PROCdouble(ask$,0,2)
  120 REPEAT
  130 name$=name$+GET$
  140 PROCdouble(name$,14,2)
  150 UNTIL RIGHT$(name$,1)=CHR$13
  160 PRINTTAB(0,6)"HELLO "name$
  170 END
  180  :
  190 DEF PROCdouble(word$,x,y)
  200 FOR n=0 TO 1
  210 PRINTTAB(x,y+n)CHR$141;word$
  220 NEXT n
  230 ENDPROC
```

Listings on cassette

If you think that keying-in all these listings will get you down and your fingers in a tangle, why not save your time and energy by sending off for our monthly listings cassette or disc?

Our monthly cassette contains all the programs featured in the yellow pages. For more information on this see page 117.

To save sending off for the cassette or disc each month, you can take advantage of our subscription offer – see page 115 for details.

Listing 3. Double height input routine for modes 0, 1, 2, 4 and 5

```
   10 REM Hints & Tips - listing 3
   20 REM Mode 4 double-height input
   30 REM by Martin Phillips
   40 REM for BBC B/B+/E/M
   50 REM (c) Acorn User August 1986
   60 :
   70 MODE 4
   80 DIM d 10
   90 VDU 23;8202;0;0;0;
  100 name$=" "
  110 ask$="Name please "
  120 PROCdouble(ask$,0,2)
  130 REPEAT
  140 g$=GET$
  150 IF g$>CHR$31 AND g$<CHR$127 THEN n
ame$=name$+g$
  160 IF g$=CHR$127 THEN PROCdelete
  170 PROCdouble(name$,14,2)
  180 UNTIL g$=CHR$13
  190 PRINTTAB(0,6)"HELLO "name$
  200 END
  210 :
  220 DEF PROCdouble(A$,x,y)
  230 X%=d MOD 256:Y%=d DIV 256:A%=10
  240 C$=CHR$240+CHR$8+CHR$10+CHR$241
  250 FOR n=1 TO LEN(A$)
  260 B$=MID$(A$,n,1)
  270 ?d=ASC(B$):CALL &FFF1
  280 VDU 23,240,d?1,d?1,d?2,d?2,d?3,d?3
,d?4,d?4
  290 VDU 23,241,d?5,d?5,d?6,d?6,d?7,d?7
,d?8,d?8
  300 PRINTTAB(x+n-1,y)C$:NEXT n
  310 ENDPROC
  320 :
  330 DEF PROCdelete
  340 VDU 7
  350 IF LEN(name$)=1 THEN ENDPROC
  360 name$=LEFT$(name$,LEN(name$)-1)
  370 PROCdouble(" ",14+LEN(name$),2)
  380 ENDPROC
```

See First Byte, page 65

Listing 1. The mystery "BANNER" program

```
   10 REM Machine-code Demo
   20 REM Tessie Revivis/Dave Acton
   30 REM for BBC B/B+/E/M
   40 REM (c) Acorn User August 1986
   50 :
   60 code%=&2E00
   70 FOR loop%=0 TO 252 STEP 4
   80 READ block$
   90 block%=EVAL("&"+block$)
  100 code%!loop%=block%
  110 NEXT
  120 count%=0
  130 FOR byte%=0 TO 255
  140 count%=count%+byte%?code%
  150 NEXT byte%
  160 IF count%=26323 THEN CALL code%
  170 PRINT"Bad checksum - check data"
  180 END
  190 :
  200 DATA 9ABD0BA2,FFEE202E,A9F710CA
```

continued ►

◀ listing 1 continued

```
  210 DATA A9788508,A9748500,A9758549
  220 DATA A6708509,2E8FBD70,79A27985
  230 DATA AA900A0,A2FFF120,1874A501
  240 DATA 852EA57D,7D75A571,72852EAD
  250 DATA 738508A9,19907916,A0A78A5
  260 DATA B669180A,2EA97685,77850069
  270 DATA 76B107A0,10887191,1871A5F9
  280 DATA 71850869,6972A5,78C67285
  290 DATA 8A90410,73C67885,E0E8CAD0
  300 DATA A5B2D009,40691874,75A57485
  310 DATA 75850069,8F1070C6,522E0F4C
  320 DATA 20555345,434F524E,D41,0
  330 DATA 17010000,80001601,80008000
  340 DATA 2008000,C0A0705,FF66110F
  350 DATA 69696FFF,66006069,696FFFFF
  360 DATA 6069,6FFFFF66,6069,FFFF6600
  370 DATA 606F,FF660000,66FF,FFFF6600
  380 DATA 606F,6FFFFF66,66006069
  390 DATA 696FFFFF,FF666069,69696FFF
  400 DATA E1056069
```

How to enter Room for Improvement

Type in each of the five listings from Joe's interior design suite and save them separately with the filenames 'MENU', 'SETUP', 'ROOM', 'FURPLAN' and 'PLANNER'. It is important that these names are used as the programs CHAIN each other.

The room outline designer ('ROOM') was originally written to work in mode 0 but so that the program is suitable for all machines (including those using ADFS), the version published uses mode 4. If you wish to use mode 0 and use a second processor or shadow screen RAM, make the following changes:

Changes to 'SETUP'

```
   60 MODE 0
  140 PRINTTAB(65,1)"                "
  150 PRINTTAB(65,2)"  ROOM DRAWER "
  160 PRINTTAB(65,3)"by Joe Telford"
  170 PRINTTAB(65,4)"  April 1986  "
  180 PRINTTAB(65,5)"                "
  190 PRINTTAB(65,5)"                "
  201 PRINTTAB(1,29)"SHIFT    RESET   LO
AD    ERASE   UNITS  SCALEv SCALE^"
  202 PRINTTAB(1,30)"NORMAL    END      SA
VE     MOVE     DRAW    FILL    TEXT  "
  203 PRINTTAB(1,31)"              f0       f
1       f2       f3       f4       f5       f6
      f7       f8";
  204 FOR loop%=0 TO 9
  205 PROCrect(8+loop%*126,16,126,96,0)
  206 NEXT
```

Changes to 'ROOM'

```
  150 PRINTTAB(66,17)"Space free:";f%-p%
;:IF f%-p%<10 PRINT" " ELSE PRINT
  160 PRINTTAB(66,19)"Dist to last"
  161 PRINTTAB(66,21)"corner:"
  190 PRINTTAB(75,21);INT((SQR((xd^2)+(y
d^2)))*2.5)
  830 DEF PROCm(x$)
  840 PRINTTAB(1,27);STRING$(78," ")
  850 PRINTTAB(1,27);x$
```

continued ▶

◀ changes continued

```
  860 ENDPROC
 1880 PROCr(986,4,16,850,1)
 1890 PROCr(0,824,984,24,1)
 2060 PRINTTAB(66,25)"Scale          ";TAB(7
2,25);s
 2070 PRINTTAB(66,23)u$(up%)
```

See Room for Improvement, page 89

Listing 1. The Room Designer Menu, which should be saved as "MENU"

```
   10 REM Roomdesigner Menu
   20 REM by Joe Telford
   30 REM for BBC B/B/M/E
   40 REM (c) Acorn User August 1986
   50 :
   60 *FX 4,2
   70 *KEY 12 U
   80 *KEY 13 D
   90 *KEY 15 U
  100 *KEY 14 D
  110 MODE 1
  120 VDU 19,0,4;0;0;0;
  130 VDU 19,1,6;0;0;0;
  140 GCOL 0,1
  150 PROCrect(0,0,1279,1023,0)
  160 PROCrect(0,0,1279,927,0)
  170 VDU 19,2,5;0;0;0;
  180 COLOUR 1
  190 PRINTTAB(1,1)"Room-Designer:  MENU
 : by Joe Telford"
  200 PROCrect(0,0,1279,92,0)
  210 PRINTTAB(1,30)"Acorn-User    :  MEN
U  :  August 1986.";
  220 PROCrect(0,0,1279,92,0)
  230 VDU 28,1,28,38,4
  240 CLS
  250 pointer=4:PROCshow
  260 REPEAT
  270 A$=CHR$(GET AND 223)
  280 IF A$="U" pointer=pointer-1:IF poi
nter=0 pointer=5
  290 IF A$="D" pointer=pointer+1:IF poi
nter=6 pointer=1
  300 PROCshow
  310 UNTIL A$=CHR$13 AND pointer<>4
  320 IF pointer=1 CHAIN"SETUP"
  330 IF pointer=2 CHAIN"FURPLAN"
  340 IF pointer=3 CHAIN"PLANNER"
  350 CLS:PRINT"Done!"
  360 END
  370 :
  380 DEF PROCshow
  390 IF pointer=1 PROCroom
  400 IF pointer=2 PROCfurplan
  410 IF pointer=3 PROCplanner
  420 IF pointer=4 PROCinstruct
  430 IF pointer=5 PROCend
  440 ENDPROC
  450 :
  460 DEF PROCroom
  470 CLS
  480 COLOUR 2
  490 PRINT"PROGRAM 1.....ROOM OUTLINER"
  500 COLOUR 3
  510 PRINT'"This program allows the use
r"
```

continued ▶

YELLOW PAGES
JOE'S JOTTINGS

◄ **Joe's listing 1 continued**

```
  520 PRINT"to design the plan view of"
  530 PRINT"a room."
  540 PRINT'"The room can then be saved
for use"
  550 PRINT"with program 3..PLANNER"
  560 COLOUR 1
  570 PRINT'"Press RETURN to load this p
rogram"
  580 ENDPROC
  590 :
  600 DEF PROCfurplan
  610 CLS
  620 COLOUR 2
  630 PRINT"PROGRAM 2.....FURNITURE PLAN
NER"
  640 COLOUR 3
  650 PRINT'"This program allows the use
r"
  660 PRINT"to design the plan view of"
  670 PRINT"up to 20 pieces of furniture
."
  680 PRINT'"These can then be saved for
 use"
  690 PRINT"with program 3..PLANNER"
  700 COLOUR 1
  710 PRINT'"Press RETURN to load this p
rogram"
  720 ENDPROC
  730 :
  740 DEF PROCplanner
  750 CLS
  760 COLOUR 2
  770 PRINT"PROGRAM 3.....PLANNER"
  780 COLOUR 3
  790 PRINT'"This program allows the use
r"
  800 PRINT"to load a room plan and a se
t"
  810 PRINT"of furniture."
  820 PRINT'"The furniture can be placed
"
  830 PRINT"as required in the room"
  840 PRINT"and the whole plan can be"
  850 PRINT"dumped to a printer"
  860 COLOUR 1
  870 PRINT'"Press RETURN to load this p
rogram"
  880 ENDPROC
  890 :
  900 DEF PROCinstruct
  910 CLS
  920 COLOUR 2
  930 PRINT"INSTRUCTIONS"
  940 COLOUR 3
  950 PRINT'"Use the UP and DOWN cursor"
  960 PRINT"keys or the 'U' and 'D' keys
"
  970 PRINT"to select the program you wa
nt."
  980 PRINT"Press RETURN to load it."
  990 ENDPROC
 1000 :
 1010 DEF PROCend
 1020 CLS
 1030 COLOUR 2
 1040 PRINT"END"
 1050 COLOUR 3
 1060 PRINT'"Use cursor keys to select a
 program."
 1070 COLOUR 1
```

continued ►

◄ **continued**

```
 1080 PRINT'"Or press RETURN now to END
the program"
 1090 ENDPROC
 1100 :
 1110 DEF PROCrect(x,y,l,w,f)
 1120 MOVE x,y:DRAW x+l,y
 1130 IF f=0 DRAW x+l,y+w ELSE PLOT 85,x
,y+w
 1140 IF f=0 DRAW x,y+w ELSE PLOT 85,x+l
,y+w
 1150 MOVE x,y+w:IF f=0 DRAW x,y ELSE MO
VE x,y
 1160 ENDPROC
```

Listing 2. Setup, which draws the screen layout. It should be saved as "SETUP"

```
   10 REM Screen Setup for Room Drawer
   20 REM by Joe Telford
   30 REM for BBC B/B+/M/E
   40 REM (c) Acorn User August 1986
   50 :
   60 MODE 4
   70 VDU 19,0,4,0;0;0;
   80 PROCfkeys
   90 CHAIN"room"
  100 END
  110 :
  120 DEF PROCfkeys
  130 COLOUR 129:COLOUR 0
  140 PRINTTAB(33,1)" ROOM "
  150 PRINTTAB(33,2)"DRAWER"
  160 PRINTTAB(33,3)"      "
  170 PRINTTAB(33,4)"by  JT"
  180 PRINTTAB(33,5)"Aug.86"
  190 PRINTTAB(33,6)"      "
  200 COLOUR 128:COLOUR 1
  210 PROCrect(8,16,1263,160,0)
  220 PROCrect(1032,176,238,820,0)
  230 VDU 24,0;176;996;1024;
  240 *FX 4,2
  250 *KEY 0 E
  260 *KEY 1 S
  270 *KEY 2 M
  280 *KEY 3 D
  290 *KEY 4 F
  300 *KEY 5 T
  310 *KEY 12 Z
  320 *KEY 13 X
  330 *KEY 14 !0
  340 *KEY 15 !Z
  350 ENDPROC
  360 :
  370 DEF PROCrect(x,y,l,w,f)
  380 MOVE x,y:DRAW x+l,y
  390 IF f=0 DRAW x+l,y+w ELSE PLOT 85,x
,y+w
  400 IF f=0 DRAW x,y+w ELSE PLOT 85,x+l
,y+w
  410 MOVE x,y+w
  420 IF f=0 DRAW x,y ELSE MOVE x,y
  430 ENDPROC
```

Listing 3. Room, which uses the layout of Setup, should be saved as "ROOM"

```
10 REM Room Outliner
20 REM by Joe Telford
30 REM for BBC B/B+/M/E
40 REM (c) Acorn User August 1986
50 :
60 PROCstart:*FX 4,2
70 ON ERROR PROCerr
80 REPEAT:PROCdesign:UNTIL FALSE:END
90 :
100 DEF PROCerr:PROCm("")
110 IF ERR=17:ENDPROC
120 PRINTTAB(0,26);:REPORT:PRINT" at "
;ERL;" : Ending!":END
130 :
140 DEF PROCdesign
150 PRINTTAB(28,30)"Free: ";f%-p%;:IF
f%-p%<10 PRINT" " ELSE PRINT
160 PRINTTAB(1,30)"Dist to Last corner
:    "
170 xd=(VAL(r$(p%-1,1))-x)/(s*r(up%))
180 yd=(VAL(r$(p%-1,2))-y)/(s*r(up%))
190 PRINTTAB(22,30);INT((SQR((xd^2)+(y
d^2)))*2.5)
200 REPEAT
210 FOR lp%=1 TO 0 STEP -1:GCOL 4,0
220 MOVE x-8,y:DRAW x+8,y
230 MOVE x,y-8:DRAW x,y+8:MOVE x,y
240 NEXT
250 a$=CHR$(INKEY(0) AND 223)
260 UNTIL a$<CHR$223:GCOL 0,1
270 IF a$=CHR$0 PROCdump
280 IF a$=CHR$15 PROCdown(10)
290 IF a$=CHR$26 PROCup(10)
300 IF a$=CHR$128 CHAIN"SETUP"
310 IF a$=CHR$129 PROCl
320 IF a$=CHR$130 PROCerase
330 IF a$=CHR$131 up%=1-up%:PROCd
340 IF a$=CHR$132 s=s-.05:PROCd
350 IF a$=CHR$133 s=s+.05:PROCd
360 IF a$=CHR$140 PROClt(1)
370 IF a$=CHR$141 PROCrt(1)
380 IF a$=CHR$142 PROCdown(1)
390 IF a$=CHR$143 PROCup(1)
400 IF a$="X" PROCrt(10)
410 IF a$="Z" PROClt(10)
420 IF a$="D" PROCdraw
430 IF a$="F" PROCfill
440 IF a$="M" PROCmove
450 IF a$="T" PROCtext
460 IF a$="S" PROCs
470 IF a$="E" PROCx
480 IF a$="P" dy$="P":PROCm("Printmast
er ROM selected")
490 IF a$="A" dy$="A":PROCm("Acorn Use
rDump ROM selected")
500 IF a$="N" dy$="N":PROCm("No Dump R
OM selected")
510 ENDPROC
520 :
530 DEF PROCs
540 PROCm("Roomname to save:")
550 INPUTTAB(20,27)""f$
560 ch%=OPENINf$
570 IF ch%<>0 CLOSE#0:PROCm("File Exis
ts!"):VDU 7:PROCdelay:PROCm(""):ENDPROC
580 ch%=OPENOUTf$:PROCm("SAVING....")
590 PRINT#ch%,ps,s,p%,up%
600 FOR lp%=0 TO p%
```

continued ▶

◀ continued

```
610 PRINT#ch%,r$(lp%,0),r$(lp%,1),r$(l
p%,2)
620 NEXT
630 CLOSE#0:PROCm("")
640 ENDPROC
650 :
660 DEF PROCl
670 PROCm("Roomname to load:")
680 INPUTTAB(20,27)""f$
690 ch%=OPENINf$
700 IF ch%=0 CLOSE#0:PROCm("No such Fi
le!"):VDU 7:PROCdelay:PROCm(""):ENDPROC
710 PROCm("LOADING...")
720 INPUT#ch%,ps,s,p%,up%
730 FOR lp%=0 TO p%
740 INPUT#ch%,r$(lp%,0),r$(lp%,1),r$(l
p%,2)
750 NEXT
760 CLOSE#0:PROCm(""):PROCd:PROCobey
770 ENDPROC
780 :
790 DEF PROCdelay
800 dy=INKEY(300)
810 ENDPROC
820 :
830 DEF PROCm(x$)
840 PRINTTAB(1,27);STRING$(38," ")
850 PRINTTAB(1,27);x$
860 ENDPROC
870 :
880 DEF PROCerase
890 IF p%=1 ENDPROC
900 p%=p%-1:r$(p%,0)=""
910 r$(p%,1)="":r$(p%,2)=""
920 PROCobey
930 ENDPROC
940 :
950 DEF PROCobey
960 VDU 26,24,22;180;997;992;29,16;176
;:CLG
970 FOR r%=0 TO p%
980 IF LEFT$(r$(r%,0),1)="D" DRAW VAL(
r$(r%,1)),VAL(r$(r%,2))
990 IF LEFT$(r$(r%,0),1)="M" MOVE VAL(
r$(r%,1)),VAL(r$(r%,2))
1000 IF LEFT$(r$(r%,0),1)="T" MOVE VAL(
r$(r%,1)),VAL(r$(r%,2)):GCOL 4,0:VDU 5:P
RINTMID$(r$(r%,0),2,LEN(r$(r%,0))-1):VDU
 4:GCOL 0,1
1010 REM Delete next REM is using M128
1020 REM IF LEFT$(r$(r%,0),1)="F" PLOT
133,VAL(r$(r%,1)),VAL(r$(r%,2))
1030 NEXT
1040 VDU 26,29,16;176;
1050 MOVE 4,4:VDU24,0;176;996;1024;
1060 ENDPROC
1070 :
1080 DEF PROCtext
1090 VDU 5:GCOL 4,0
1100 INPUT""t$:VDU 4:GCOL 0,1
1110 IF t$="" ENDPROC
1120 r$(p%,0)="T"+t$:r$(p%,1)=STR$(x)
1130 r$(p%,2)=STR$(y)
1140 p%=p%+1:IF p%=f% VDU 7
1150 ENDPROC
1160 :
1170 DEF PROCmove
1180 IF p%=f% VDU 7:ENDPROC
1190 r$(p%,0)="M":r$(p%,1)=STR$(x)
```

continued ▶

◀ **Joe's listing 3 continued**

```
1200 r$(p%,2)=STR$(y):p%=p%+1
1210 ENDPROC
1220 :
1230 DEF PROCdraw
1240 IF p%=f% VDU 7:ENDPROC
1250 r$(p%,0)="D":r$(p%,1)=STR$(x)
1260 r$(p%,2)=STR$(y):p%=p%+1
1270 MOVE VAL(r$(p%-2,1)),VAL(r$(p%-2,2
))
1280 DRAW VAL(r$(p%-1,1)),VAL(r$(p%-1,2
))
1290 ENDPROC
1300 :
1310 DEF PROCfill:ENDPROC
1320 REM Remove ENDPROC if using M128
1330 IF p%=f% VDU 7:ENDPROC
1340 r$(p%,0)="F":r$(p%,1)=STR$(x)
1350 r$(p%,2)=STR$(y):p%=p%+1
1360 PLOT 133,VAL(r$(p%-1,1)),VAL(r$(p%
-1,2))
1370 ENDPROC
1380 :
1390 DEF PROCx
1400 PROCm("Done!"):*FX 4,0
1410 CHAIN"MENU"
1420 :
1430 DEF PROClt(v)
1440 xd=4*s*r(up%)/v
1450 IF x-xd<4 VDU 7:ENDPROC
1460 x=x-xd
1470 ENDPROC
1480 :
1490 DEF PROCrt(v)
1500 xd=4*s*r(up%)/v
1510 IF x+xd>980 VDU 7:ENDPROC
1520 x=x+xd
1530 ENDPROC
1540 :
1550 DEF PROCup(v)
1560 yd=4*s*r(up%)/v
1570 IF y+yd>816 VDU 7:ENDPROC
1580 y=y+yd
1590 ENDPROC
1600 :
1610 DEF PROCdown(v)
1620 yd=4*s*r(up%)/v
1630 IF y-yd<4 VDU 7:ENDPROC
1640 y=y-yd
1650 ENDPROC
1660 :
1670 DEF PROCstart
1680 VDU 24,0;176;996;1024;
1690 f%=40:p%=1
1700 DIM r$(f%,2)
1710 p%=1:r$(0,0)="M"
1720 r$(0,1)="0":r$(0,2)="0"
1730 DIM u$(1)
1740 u$(0)="cms":u$(1)="ins"
1750 DIM r(1)
1760 r(0)=10:r(1)=25.4
1770 dy$="":up%=0:s=.5:ps=75
1780 PROCd
1790 ENDPROC
1800 :
1810 DEF PROCd
1820 LOCAL x,y
1830 VDU 29,16;176;
1840 MOVE 0,0:c%=0
1850 PROCr(0,0,984,820,0)
```

continued ▶

◀ **continued**

```
1860 GCOL 0,0
1870 PROCr(-1,4,-15,850,1)
1880 PROCr(990,4,16,850,1)
1890 PROCr(0,824,984,24,1)
1900 GCOL 0,1
1910 FOR y=4 TO 820 STEP 4*s*r(up%)
1920 c%=c%+1
1930 MOVE 0,y:DRAW -8,y
1940 IF c%=10 DRAW -16,y
1950 MOVE 984,y:DRAW 992,y
1960 IF c%=10 c%=0:DRAW 1000,y
1970 NEXT y
1980 c%=0
1990 FOR x=4 TO 984 STEP 4*s*r(up%)
2000 c%=c%+1
2010 MOVE x,820:DRAW x,828
2020 IF c%=10 c%=0:DRAW x,836
2030 NEXT x
2040 IF s>2 s=2
2050 IF s<.2 s=.2
2060 PRINTTAB(1,28)"Scale       ";TAB(72
,25);s
2070 PRINTTAB(7,28)u$(up%)
2080 x=4:y=4
2090 ENDPROC
2100 :
2110 DEF PROCdump
2120 IF dy$="P" THEN *WINDOW
2130 IF dy$="P" THEN *GDUMP 3 1 3 1
2140 IF dy$="A" THEN *SDUMP
2150 VDU 26,29,16;176;
2160 MOVE 4,4:VDU 24,0;176;996;1024;
2170 ENDPROC
2180 :
2190 DEF PROCr(x,y,l,w,f)
2200 MOVE x,y:DRAW x+l,y
2210 IF f=0 DRAW x+l,y+w ELSE PLOT 85,x
,y+w
2220 IF f=0 DRAW x,y+w ELSE PLOT 85,x+l
,y+w
2230 MOVE x,y+w
2240 IF f=0 DRAW x,y ELSE MOVE x,y
2250 ENDPROC
```

◀ **Listing 4. The furniture planner should be saved as "FURPLAN"**

```
10 REM Furniture Planner
20 REM by Joe Telford
30 REM for BBC B/B+/M/E
40 REM (c) Acorn User August 1986
50 :
60 MODE 4:VDU19,0,4,0;0;0;
70 PROCfkeys
80 PROCmess("Furniture-Planner        J
Telford 1986")
90 PROCstart:*FX4,2
100 ON ERROR PROCerr
110 GCOL 0,1
120 REPEAT:PROCselect:PROCobey(fp%)
130 sx=4:sy=4
140 REPEAT:PROCdesign
150 UNTILa$="E":UNTILFALSE:END
160 :
170 DEF PROCerr:GCOL 0,1:PROCmess("")
180 IF ERR=17:ENDPROC
190 PRINTTAB(0,26);:REPORT:PRINT" at "
;ERL;" : Ending!":END
```

continued ▶

◀ continued

```
  200 :
  210 DEF PROCselect
  220 REPEAT
  230 a$=CHR$(223 AND GET)
  240 IF a$=CHR$0 PROCdump
  250 IF a$=CHR$15 fp%=fp%+1:IF fp%=21 f
p%=20:VDU 7
  260 IF a$=CHR$26 fp%=fp%-1:IF fp%=0 fp
%=1:VDU 7
  270 IF a$=CHR$128 RUN
  280 IF a$=CHR$129 PROCload
  290 IF a$=CHR$131 up%=1-up%:PROCd
  300 IF a$="E" PROCexit
  310 IF a$="S" PROCsave
  320 IF a$="P" dump$="P":PROCmess("Prin
tmaster dump ROM selected"):PROCdelay
  330 IF a$="A" dump$="A":PROCmess("Acor
n UserDump ROM selected"):PROCdelay
  340 IF a$="N" dump$="N":PROCmess("No d
ump ROM selected"):PROCdelay
  350 PROClist
  360 UNTIL a$=CHR$13
  370 PROCmess("Item name:")
  380 INPUTTAB(11,27)""name$
  390 IF name$>"$" THEN name$(fp%)=name$
  400 PROClist
  410 ENDPROC
  420 :
  430 DEF PROCdesign
  440 xd=(VAL(p$(fp%,fp%(fp%)-1,1))-sx)/
(s*r(up%))
  450 yd=(VAL(p$(fp%,fp%(fp%)-1,2))-sy)/
(s*r(up%))
  460 PROCmess("Free:"+STR$(full%-fp%(fp
%))+" last point:"+STR$(INT(SQR((xd^2)+(
yd^2))*2.5))+u$(up%)+" "+LEFT$(name$(fp%
),11))
  470 REPEAT
  480 FOR loop%=1 TO 0 STEP -1:GCOL 4,0
  490 MOVE sx-8,sy:DRAW sx+8,sy
  500 MOVE sx,sy-8:DRAW sx,sy+8
  510 MOVE sx,sy
  520 NEXT
  530 a$=CHR$(INKEY(0) AND 223)
  540 UNTIL a$>=CHR$0 AND a$<CHR$223
  550 GCOL 0,1
  560 IF a$=CHR$0 PROCdump
  570 IF a$=CHR$15 PROCdown(10)
  580 IF a$=CHR$128 RUN
  590 IF a$=CHR$129 PROCload
  600 IF a$=CHR$130 PROCerase
  610 IF a$=CHR$131 up%=1-up%:PROCd
  620 IF a$=CHR$26 PROCup(10)
  630 IF a$=CHR$140 PROCleft(1)
  640 IF a$=CHR$141 PROCright(1)
  650 IF a$=CHR$142 PROCdown(1)
  660 IF a$=CHR$143 PROCup(1)
  670 IF a$="Z" PROCleft(10)
  680 IF a$="X" PROCright(10)
  690 IF a$="M" PROCmove
  700 IF a$="D" PROCdraw
  710 IF a$="S" PROCsave
  720 IF a$="P" dump$="P":PROCmess("Prin
tmaster dump ROM selected"):PROCdelay
  730 IF a$="A" dump$="A":PROCmess("Acor
n User-dump ROM selected"):PROCdelay
  740 IF a$="N" dump$="N":PROCmess("No d
ump ROM selected"):PROCdelay
  750 ENDPROC
  760 :
```

continued ▶

◀ continued

```
  770 DEF PROCsave
  780 PROCmess("")
  790 INPUTTAB(1,27)"Filename to save: "
f$
  800 ch%=OPENINf$
  810 IF ch%<>0 CLOSE#0:PROCmess("File E
xists!"):VDU 7:PROCdelay:PROCmess(""):EN
DPROC
  820 ch%=OPENOUTf$
  830 PROCmess("SAVING...."+f$)
  840 PRINT#ch%,pieces%,s
  850 FOR loop%=0 TO pieces%
  860 PRINT#ch%,fp%(loop%),name$(loop%)
  870 FOR iloop%=0 TO fp%(loop%)
  880 PRINT#ch%,p$(loop%,iloop%,0),p$(lo
op%,iloop%,1),p$(loop%,iloop%,2)
  890 NEXT
  900 NEXT
  910 CLOSE#0:PROCmess(""):ENDPROC
  920 :
  930 DEF PROCload
  940 PROCmess("")
  950 INPUTTAB(1,27)"Filename to load: "
f$
  960 ch%=OPENINf$
  970 IF ch%=0 CLOSE#0:PROCmess("No such
 File!"):VDU 7:PROCdelay:PROCmess(""):EN
DPROC
  980 PROCmess("LOADING..."+f$)
  990 INPUT#ch%,pieces%,s
 1000 FOR loop%=0 TO pieces%
 1010 INPUT#ch%,fp%(loop%),name$(loop%)
 1020 FOR iloop%=0 TO fp%(loop%)
 1030 INPUT#ch%,p$(loop%,iloop%,0),p$(lo
op%,iloop%,1),p$(loop%,iloop%,2)
 1040 NEXT
 1050 NEXT
 1060 CLOSE#0:PROCmess(""):ENDPROC
 1070 :
 1080 DEF PROCdelay
 1090 dummy=INKEY(300)
 1100 ENDPROC
 1110 :
 1120 DEF PROCmess(x$)
 1130 COLOUR 1:COLOUR 128
 1140 PRINTTAB(1,27);STRING$(38," ")
 1150 PRINTTAB(1,27);x$
 1160 ENDPROC
 1170 :
 1180 DEF PROCerase
 1190 IF fp%(fp%)=1 name$(fp%)="Spare ":
PROClist:ENDPROC
 1200 fp%(fp%)=fp%(fp%)-1
 1210 p$(fp%,fp%(fp%),0)="M"
 1220 p$(fp%,fp%(fp%),1)="4"
 1230 p$(fp%,fp%(fp%),2)="4"
 1240 PROCobey(fp%)
 1250 ENDPROC
 1260 :
 1270 DEF PROCobey(p%)
 1280 VDU 26,24,20;180;997;992;29,16;176
;:CLG
 1290 FOR r%=0 TO fp%(p%)
 1300 IF LEFT$(p$(fp%,r%,0),1)="D" DRAW
VAL(p$(fp%,r%,1)),VAL(p$(fp%,r%,2))
 1310 IF LEFT$(p$(fp%,r%,0),1)="M" MOVE
VAL(p$(fp%,r%,1)),VAL(p$(fp%,r%,2))
 1320 NEXT
 1330 VDU 26,29,16;176;:MOVE 4,4
```

continued ▶

◀ **Joe's listing 4 continued**

```
 1340 VDU 24,0;176;996;1024;
 1350 ENDPROC
 1360 :
 1370 DEF PROCmove
 1380 p$(fp%,fp%(fp%),0)="M"
 1390 p$(fp%,fp%(fp%),1)=STR$(sx)
 1400 p$(fp%,fp%(fp%),2)=STR$(sy)
 1410 fp%(fp%)=fp%(fp%)+1
 1420 IF p%=full% VDU 7
 1430 ENDPROC
 1440 :
 1450 DEF PROCdraw
 1460 p$(fp%,fp%(fp%),0)="D"
 1470 p$(fp%,fp%(fp%),1)=STR$(sx)
 1480 p$(fp%,fp%(fp%),2)=STR$(sy)
 1490 fp%(fp%)=fp%(fp%)+1
 1500 IF fp%(fp%)=full% VDU7
 1510 MOVE VAL(p$(fp%,fp%(fp%)-2,1)),VAL
(p$(fp%,fp%(fp%)-2,2))
 1520 DRAW VAL(p$(fp%,fp%(fp%)-1,1)),VAL
(p$(fp%,fp%(fp%)-1,2))
 1530 ENDPROC
 1540 :
 1550 DEF PROCexit
 1560 PROCmess("Done!"):*FX 4,0
 1570 CHAIN"MENU"
 1580 :
 1590 DEF PROCleft(v)
 1600 xd=4*s*r(up%)/v
 1610 IF sx-xd<4 VDU 7:ENDPROC
 1620 sx=sx-xd
 1630 ENDPROC
 1640 :
 1650 DEF PROCright(v)
 1660 xd=4*s*r(up%)/v
 1670 IF sx+xd>980 VDU 7:ENDPROC
 1680 sx=sx+xd
 1690 ENDPROC
 1700 :
 1710 DEF PROCup(v)
 1720 yd=4*s*r(up%)/v
 1730 IF sy+yd>816 VDU 7:ENDPROC
 1740 sy=sy+yd
 1750 ENDPROC
 1760 :
 1770 DEF PROCdown(v)
 1780 yd=4*s*r(up%)/v
 1790 IF sy-yd<4 VDU 7:ENDPROC
 1800 sy=sy-yd
 1810 ENDPROC
 1820 :
 1830 DEF PROCstart
 1840 VDU 24,0;176;996;1024;
 1850 full%=20:pieces%=20
 1860 DIM fp%(pieces%),p$(pieces%,full%,
2),name$(pieces%)
 1870 DIM u$(1),r(1)
 1880 u$(0)="cm":u$(1)="ins"
 1890 r(0)=10:r(1)=25.4
 1900 up%=0:s=1:Ps=75:fp%=1
 1910 FOR loop%=1 TO pieces%
 1920 p$(loop%,0,0)="M"
 1930 p$(loop%,0,1)="4"
 1940 p$(loop%,0,2)="4"
 1950 fp%(loop%)=1
 1960 name$(loop%)="Spare ":NEXT
 1970 PROClist
 1980 PROCd
 1990 ENDPROC
```

continued ▶

◀ continued

```
 2000 :
 2010 DEF PROClist
 2020 FOR loop%=1 TO pieces%
 2030 IF loop%=fp% THEN COLOUR 129:COLOU
R 0 ELSE COLOUR 128:COLOUR 1
 2040 PRINTTAB(33,5+loop%);STRING$(6," "
)
 2050 PRINTTAB(33,5+loop%);LEFT$(name$(l
oop%),6)
 2060 NEXT
 2070 ENDPROC
 2080 :
 2090 DEF PROCd
 2100 VDU 29,16;176;:MOVE 0,0:c%=0
 2110 PROCr(0,0,984,820,0)
 2120 GCOL 0,0:PROCr(-1,4,-15,850,1)
 2130 PROCr(988,4,16,850,1)
 2140 PROCr(0,824,984,24,1):GCOLO,1
 2150 FOR y=4 TO 820 STEP 4*s*r(up%)
 2160 c%=c%+1
 2170 MOVE 0,y:DRAW -8,y
 2180 IF c%=10:DRAW -16,y
 2190 MOVE 984,y:DRAW 992,y
 2200 IF c%=10 c%=0:DRAW 1000,y
 2210 NEXT y:c%=0
 2220 FOR x=4 TO 984 STEP 4*s*r(up%)
 2230 c%=c%+1
 2240 MOVE x,820:DRAW x,828
 2250 IF c%=10 c%=0:DRAW x,836
 2260 NEXT x
 2270 IF s>2 s=2
 2280 IF s<.2 s=.2
 2290 sx=4:sy=4:ENDPROC
 2300 :
 2310 DEF PROCdump
 2320 PROCmess(LEFT$(name$(fp%),31)+" :1
0"+u$(up%))
 2330 IF dump$="P" THEN *WINDOW
 2340 IF dump$="P" THEN *GDUMP 3 0 4 2
 2350 IF dump$="A" THEN *SDUMP
 2360 VDU 26,29,16;176;
 2370 MOVE 4,4
 2380 VDU 24,0;176;996;1024;
 2390 ENDPROC
 2400 :
 2410 DEF PROCr(x,y,l,w,f)
 2420 MOVE x,y:DRAW x+l,y
 2430 IF f=0 DRAW x+l,y+w ELSE PLOT 85,x
,y+w
 2440 IF f=0 DRAW x,y+w ELSE PLOT 85,x+l
,y+w
 2450 MOVE x,y+w
 2460 IF f=0 DRAW x,y ELSE MOVE x,y
 2470 ENDPROC
 2480 :
 2490 DEF PROCfkeys
 2500 COLOUR 129:COLOUR 0
 2510 PRINTTAB(33,1)"      "
 2520 PRINTTAB(33,2)" Fur- "
 2530 PRINTTAB(33,3)" Plan "
 2540 PRINTTAB(33,4)"      "
 2550 COLOUR 128:COLOUR 1
 2560 PRINTTAB(1,29)"SHIFT     RESET   LO
AD    ERASE   UNITS "
 2570 PRINTTAB(1,30)"NORMAL    END     SA
VE    MOVE    DRAW "
 2580 PRINTTAB(1,31)"          f0        f
1       f2       f3  ";
 2590 FOR loop%=0 TO 4
```

continued ▶

◀ continued

```
2600 :
2610 PROCr(8+loop%*252,16,252,96,0)
2620 NEXT
2630 PROCr(8,16,1263,160,0)
2640 PROCr(1032,176,238,820,0)
2650 VDU 24,0;176;996;1024;
2660 *KEY 0 E
2670 *KEY 1 S
2680 *KEY 2 M
2690 *KEY 3 D
2700 *KEY 12 Z
2710 *KEY 13 X
2720 *KEY 14 |0
2730 *KEY 15 |Z
2740 ENDPROC
```

Listing 5. The room planner, which you should save as "PLANNER"

```
10 REM Room Planner
20 REM by Joe Telford
30 REM for BBC B/B+/M/E
40 REM (c) Acorn User August 1986
50 :
60 MODE 4
70 VDU 19,0,4,0;0;
80 PROCfkeys
90 PROCmess("Room-Planner   by J Telf
ord 1986")
100 PROCstart:*FX 4,2
110 ON ERROR PROCerr
120 GCOL 0,1
130 REPEAT:PROCselect
140 REPEAT:PROCdesign
150 UNTIL a$="E"
160 UNTIL FALSE
170 :
180 DEF PROCerr:GCOL 0,1:PROCmess("")
190 IF ERR=17:ENDPROC
200 PRINTTAB(0,26);:REPORT:PRINT" at "
;ERL;":Ending!":*FX 4,0
210 END
220 :
230 DEF PROCselect
240 REPEAT
250 a$=CHR$(223 AND GET)
260 IF a$=CHR$0 PROCdump
270 IF a$=CHR$15 fp%=fp%+1:IF fp%=21 f
p%=20:VDU 7
280 IF a$=CHR$26 fp%=fp%-1:IF fp%=-1 f
p%=0:VDU 7
290 IF a$=CHR$128 RUN
300 IF a$=CHR$129 PROCload
310 IF a$=CHR$131 up%=1-up%:PROCd
320 IF a$="E" PROCexit
330 IF a$="P" dump$="P":PROCmess("Prin
tmaster ROM dump selected"):PROCdelay
340 IF a$="A" dump$="A":PROCmess("Acor
n User-dump ROM selected"):PROCdelay
350 IF a$="N" dump$="N":PROCmess("No d
ump ROM selected"):PROCdelay
360 PROClist
370 UNTIL a$=CHR$13 AND name$(fp%)<>"S
pare "
380 PROClist
390 IF fp%>0 sx=400:sy=400
400 ENDPROC
```

continued ▶

◀ continued

```
410 :
420 DEF PROCdesign
430 PROCmess(LEFT$(name$(fp%),22)+" tu
rned:"+STR$angle+" deg")
440 REPEAT
450 GCOL 4,0
460 IF fp%=0 MOVE sx-8,sy:DRAW sx+8,sy
:MOVE sx,sy-8:DRAW sx,sy+8:MOVE sx,sy EL
SE PROCdrawfurn(fp%,4)
470 a$=CHR$(GET AND 223)
480 IF fp%=0 MOVE sx-8,sy:DRAW sx+8,sy
:MOVE sx,sy-8:DRAW sx,sy+8:MOVE sx,sy EL
SE PROCdrawfurn(fp%,4)
490 UNTIL a$>=CHR$0 AND a$<CHR$223
500 GCOL 0,1
510 IF a$=CHR$0 PROCdump
520 IF a$=CHR$15 PROCdown(10)
530 IF a$=CHR$26 PROCup(10)
540 IF a$=CHR$128 RUN
550 IF a$=CHR$130 PROCdrawfurn(fp%,0)
560 IF a$=CHR$129 PROCload
570 IF a$=CHR$140 PROCleft(1)
580 IF a$=CHR$141 PROCright(1)
590 IF a$=CHR$142 PROCdown(1)
600 IF a$=CHR$143 PROCup(1)
610 IF a$=CHR$131 up%=1-up%:PROCd
620 IF a$="D" PROCdrawfurn(fp%,1)
630 IF a$="R" angle=(angle+45) MOD 360
640 IF a$="S" angle=(angle+315) MOD 36
0
650 IF a$="X" PROCright(10)
660 IF a$="Z" PROCleft(10)
670 IF a$="P" dump$="P":PROCmess("Prin
tmaster ROM dump selected"):PROCdelay
680 IF a$="A" dump$="A":PROCmess("Acor
n Userdump ROM selected"):PROCdelay
690 IF a$="N" dump$="N":PROCmess("No d
ump ROM selected"):PROCdelay
700 ENDPROC
710 :
720 DEF PROCload
730 PROCloadroom:PROCloadfurniture
740 ENDPROC
750 :
760 DEF PROCloadroom
770 PROCmess("")
780 INPUTTAB(1,27)"Room filename to lo
ad: "f$
790 ch%=OPENINf$
800 IF ch%=0 CLOSE#0:PROCmess("No such
 file!"):VDU 7:PROCdelay:PROCmess(""):EN
DPROC
810 PROCmess("LOADING ROOM..."+f$)
820 rm$=f$
830 INPUT#ch%,ps,s,p%,up%
840 FOR loop%=0 TO p%
850 INPUT#ch%,rp$(loop%,0),rp$(loop%,1
),rp$(loop%,2):NEXT
860 CLOSE#0
870 PROCmess(""):PROCd:PROCdrawroom
880 ENDPROC
890 :
900 DEF PROCloadfurniture
910 angle=0:PROCmess("")
920 INPUTTAB(1,27)"Furniture to load:
"f$
930 IF f$="" PROCmess(""):ENDPROC
940 ch%=OPENINf$
```

continued ▶

◀ Joe's listing 5 continued

```
950 IF ch%=0 CLOSE#0:PROCmess("No such File!"):VDU 7:PROCdelay:PROCmess(""):ENDPROC
960 PROCmess("LOADING FURNITURE..."+f$):fn$=f$:INPUT#ch%,pieces%,dummy
970 FOR loop%=0 TO pieces%
980 INPUT#ch%,fp%(loop%),name$(loop%)
990 FOR iloop%=0 TO fp%(loop%)
1000 INPUT#ch%,A$,B$,C$
1010 p(loop%,iloop%,0)=4
1020 IF A$="D" p(loop%,iloop%,0)=5
1030 p(loop%,iloop%,1)=VAL(B$)*s
1040 p(loop%,iloop%,2)=VAL(C$)*s
1050 NEXT
1060 NEXT
1070 CLOSE#0:PROCmess("")
1080 name$(0)="CURSOR"
1090 PROClist
1100 PROCconvert
1110 ENDPROC
1120 :
1130 DEF PROCconvert
1140 FOR loop%=0 TO pieces%
1150 p(loop%,0,1)=0:p(loop%,0,2)=0
1160 p(loop%,0,0)=4
1170 IF fp%(loop%)>1 xval=p(loop%,1,1):yval=p(loop%,1,2):p(loop%,1,1)=0:p(loop%,1,2)=0
1180 IF fp%(loop%)>2 THEN FOR iloop%=2 TO fp%(loop%):p(loop%,iloop%,1)=p(loop%,iloop%,1)-xval:p(loop%,iloop%,2)=p(loop%,iloop%,2)-yval:NEXT
1190 NEXT:PRINT
1200 FOR loop%=0 TO pieces%
1210 IF fp%(loop%)>2 PROCpolar
1220 NEXT
1230 ENDPROC
1240 :
1250 DEF PROCpolar
1260 FOR iloop%=2 TO fp%(loop%)
1270 x=p(loop%,iloop%,1)
1280 y=p(loop%,iloop%,2)
1290 p(loop%,iloop%,1)=SQR(x*x+y*y)
1300 IF p(loop%,iloop%,1)=0 THEN p(loop%,iloop%,2)=0 ELSE p(loop%,iloop%,2)=(DEG(ASN(y/p(loop%,iloop%,1)))+360) MOD 360
1310 NEXT
1320 ENDPROC
1330 :
1340 DEF PROCdelay
1350 dummy=INKEY(300)
1360 ENDPROC
1370 :
1380 DEF PROCmess(x$)
1390 COLOUR 1:COLOUR 128
1400 PRINTTAB(1,27);STRING$(38," ")
1410 PRINTTAB(1,27);x$
1420 ENDPROC
1430 :
1440 DEF PROCmess1(w$,x$,y$,z$)
1450 PRINTTAB(1,27);STRING$(38," ")
1460 PRINTTAB(1,27);w$
1470 PRINTTAB(1,28);STRING$(38," ")
1480 PRINTTAB(1,28);x$
1490 PRINTTAB(1,29);STRING$(38," ")
1500 PRINTTAB(1,29);y$
1510 PRINTTAB(1,30);STRING$(38," ")
1520 PRINTTAB(1,30);z$
1530 ENDPROC
```

continued ▶

◀ continued

```
1540 :
1550 DEF PROCdrawfurn(p%,gcol)
1560 GCOL 0,1:IF gcol=0 GCOL 0,0
1570 IF gcol=4 GCOL 4,0
1580 FOR r%=0 TO fp%(p%)
1590 PLOT p(fp%,r%,0),INT(sx+2+p(fp%,r%,1)*COS(RAD((p(p%,r%,2)+angle) MOD 360))),INT(sy+2+p(fp%,r%,1)*SIN(RAD((p(fp%,r%,2)+angle) MOD 360)))
1600 NEXT
1610 ENDPROC
1620 :
1630 DEF PROCdrawroom
1640 VDU 26,24,20;180;997;992;29,16;176;
1650 CLG
1660 FOR r%=0 TO p%
1670 IF LEFT$(rp$(r%,0),1)="D" DRAW VAL(rp$(r%,1)),VAL(rp$(r%,2))
1680 IF LEFT$(rp$(r%,0),1)="M" MOVE VAL(rp$(r%,1)),VAL(rp$(r%,2))
1690 REM Delete next REM if using M128
1700 REM IF LEFT$(rp$(r%,0),1)="F" PLOT 133,VAL(rp$(r%,1)),VAL(rp$(r%,2))
1710 NEXT
1720 VDU 26,29,16;176;
1730 MOVE 4,4
1740 VDU 24,0;176;996;1024;
1750 ENDPROC
1760 :
1770 DEF PROCexit
1780 PROCmess("Done!"):*FX 4,0
1790 CHAIN"MENU"
1800 :
1810 DEF PROCleft(v)
1820 xd=4*s*r(up%)/v
1830 sx=sx-xd
1840 ENDPROC
1850 :
1860 DEF PROCright(v)
1870 xd=4*s*r(up%)/v
1880 sx=sx+xd
1890 ENDPROC
1900 :
1910 DEF PROCup(v)
1920 yd=4*s*r(up%)/v
1930 sy=sy+yd
1940 ENDPROC
1950 :
1960 DEF PROCdown(v)
1970 yd=4*s*r(up%)/v
1980 sy=sy-yd
1990 ENDPROC
2000 :
2010 DEF PROCstart
2020 VDU 24,0;176;996;1024;
2030 full%=20:pieces%=20
2040 DIM rp$(40,2),fp%(pieces%),p(pieces%,full%,2),name$(pieces%)
2050 DIM u$(1),r(1)
2060 u$(0)="cm":u$(1)="ins"
2070 r(0)=10:r(1)=25.4
2080 angle=0:up%=0:s=1:ps=75:fp%=0
2090 name$(0)="CURSOR"
2100 FOR loop%= 1 TO pieces%
2110 p(loop%,0,0)=4:p(loop%,0,1)=0
2120 p(loop%,0,2)=0
2130 fp%(loop%)=1
```

continued ▶

◀ continued

```
 2140 name$(loop%)="Spare "
 2150 NEXT
 2160 PROClist
 2170 PROCd
 2180 sx=400:sy=400
 2190 dump$=""
 2200 ENDPROC
 2210 :
 2220 DEF PROClist
 2230 FOR loop%=0 TO pieces%
 2240 IF loop%=fp% THEN COLOUR 129:COLOU
R 0 ELSE COLOUR 128:COLOUR 1
 2250 PRINTTAB(33,5+loop%);STRING$(6," "
)
 2260 PRINTTAB(33,5+loop%);LEFT$(name$(l
oop%),6)
 2270 NEXT
 2280 ENDPROC
 2290 :
 2300 DEF PROCd
 2310 VDU 29,16;176;:MOVE 0,0:c%=0
 2320 PROCr(0,0,984,820,0)
 2330 GCOL 0,0:PROCr(-1,4,-15,850,1)
 2340 PROCr(988,4,16,850,1)
 2350 PROCr(0,824,984,24,1):GCOL 0,1
 2360 FOR y=4 TO 820 STEP 4*s*r(up%)
 2370 c%=c%+1:MOVE 0,y:DRAW -8,y
 2380 IF c%=10:DRAW -16,y
 2390 MOVE 984,y:DRAW 992,y
 2400 IF c%=10 c%=0:DRAW 1000,y
 2410 NEXT y
 2420 c%=0
 2430 FOR x=4 TO 984 STEP 4*s*r(up%)
 2440 c%=c%+1
 2450 MOVE x,820:DRAW x,828
 2460 IF c%=10 c%=0:DRAW x,836
 2470 NEXT x
 2480 ENDPROC
 2490 :
 2500 DEF PROCdump
 2510 PROCmess1("Room      : "+rm$,"Furni
ture:  "+fn$,"Units marked every 10 "+u$(
up%),"")
 2520 IF dump$="P" THEN *WINDOW
 2530 IF dump$="P" THEN *GDUMP 3 0 4 2
 2540 IF dump$="A" THEN *SDUMP
 2550 PROCmess1("","","","")
```

continued ▶

◀ continued

```
 2560 VDU 26:GCOL 0,1
 2570 PROCkeystrip
 2580 VDU 26,29,16;176;
 2590 MOVE 4,4:VDU 24,0;176;996;1024;
 2600 ENDPROC
 2610 :
 2620 DEF PROCr(x,y,l,w,f)
 2630 MOVE x,y:DRAW x+l,y
 2640 IF f=0 DRAW x+l,y+w ELSE PLOT 85,x
,y+w
 2650 IF f=0 DRAW x,y+w ELSE PLOT 85,x+l
,y+w
 2660 MOVE x,y+w
 2670 IF f=0 DRAW x,y ELSE MOVE x,y
 2680 ENDPROC
 2690 :
 2700 DEF PROCfkeys
 2710 COLOUR 129:COLOUR 0
 2720 PRINTTAB(33,1)"      "
 2730 PRINTTAB(33,2)" Room "
 2740 PRINTTAB(33,3)" Plan "
 2750 PRINTTAB(33,4)"      "
 2760 COLOUR 128:COLOUR 1
 2770 PROCkeystrip
 2780 PROCr(8,16,1263,160,0)
 2790 PROCr(1032,176,238,820,0)
 2800 VDU 24,0;176;996;1024;
 2810 *KEY 0 E
 2820 *KEY 1 S
 2830 *KEY 2 R
 2840 *KEY 3 D
 2850 *KEY 12 Z
 2860 *KEY 13 X
 2870 *KEY 14 |O
 2880 *KEY 15 |Z
 2890 ENDPROC
 2900 :
 2910 DEF PROCkeystrip
 2920 PRINTTAB(1,29)"SHIFT     RESET    LO
AD     ERASE    UNITS"
 2930 PRINTTAB(1,30)"NORMAL    END      RO
T>     <ROT     DRAW"
 2940 PRINTTAB(1,31)"                  f0       f
1     f2       f3";
 2950 FOR loop%=0 TO 4
 2960 PROCr(8+loop%*252,16,252,96,0)
 2970 NEXT
 2980 ENDPROC
```

How to enter Dodo it Yourself

The Moving Picture suite consists of six programs. These should be typed in and saved with the filenames specified in the article and captions.

It is vitally important to read the article on page 96 before attempting to use the Moving Picture Program. Particularly important is to work through the test run. This will save you time and avoid frustration.

See Dodo it Yourself, page 96. NB: all Dodo listings are WIDTH = 24

Listing 1. The menu of the Moving Picture program, which should be saved as "MENU"

```
   10 REM Moving Picture
 Menu
   20 REM by M J Sherrat
t
   30 REM for BBC B/B+/M
 with discs
   40 REM (c) Acorn User
 August 1986
   50 :
   60 MODE 1
   70 DIM oscli% 50,w 10
,data% 255
   80 ON ERROR MODE 6:RE
PORT:PRINT" at line ";ER
L:END
   90 VDU 23,1,0;0;0;0;
  100 COLOUR 129:CLS
  110 PROCw(2,6,37,3,1,2
)
  120 PROCc(4,"The Movin
g Picture Program")
  130 PROCw(17,11,22,9,1
,3)
  140 PRINT'" Menu"
  150 PROCw(10,25,28,15,
0,3)
  160 PRINT'" 1...Pixel
Editor"
  170 PRINT'" 2...Screen
 Editor"
  180 PRINT'" 3...Data E
ditor"
```

continued ▶

◄ **Dodo listing 1 continued**

```
  190 PRINT'" 4...Combiner"
  200 PRINT'" 5...Animator"
  210 REPEAT
  220 A%=(GET OR 16)-48
  230 UNTIL A%>=1 AND A%<=5
  240 IF A%=1 CHAIN"PIXEL"
  250 IF A%=2 CHAIN"SEDITOR"
  260 IF A%=3 CHAIN"DATEDIT"
  270 IF A%=4 CHAIN"COMBINE"
  280 CHAIN"ANIMATR"
  290 :
  300 DEF PROCoscli($oscli%)
  310 X%=oscli%:Y%=oscli% DIV 256
  320 CALL &FFF7:ENDPROC
  330 :
  340 DEF PROCc(y,t$)
  350 VDU 26,31,20-LENt$/2,y
  360 FOR z=1 TO LENt$
  370 ?w=ASCMID$(t$,z,1)
  380 X%=w:Y%=w DIV 256:A%=&A
  390 CALL &FFF1
  400 VDU 23,224,w?1,w!1;w!2;w!3;w?4
  410 VDU 23,225,w?5,w!5;w!6;w!7;w?8
  420 VDU 224,8,10,225,11:NEXT
  430 ENDPROC
  440 :
  450 DEF PROCw(l,d,r,u,p,q)
  460 VDU 24,l*32-16;(31-d)*32-16;(r+1)*32-16;(32-u)*32-16;
  470 GCOL 0,131:CLG
  480 VDU 24,l*32-12;(31-d)*32-12;(r+1)*32-20;(32-u)*32-20;
  490 GCOL 0,128:CLG
  500 COLOUR p:COLOUR 128+q:
  510 VDU 28,l,d,r,u,12
  520 ENDPROC
```

◄ **Listing 2. The Pixel Editor should be saved as "PIXEL"**

```
   10 REM The Moving Picture Program
   20 REM Pixel Editor
   30 REM Mike Williams/Mike Sherratt
   40 REM for BBC B/B+/M with discs
   50 REM (c) Acorn User August 1986
   60 :
   70 ON ERROR IF ERR=17 CHAIN"MENU" ELSE CLS:REPORT:PRINT" at line ";ERL:END
   80 MODE 1
   90 store%=(HIMEM-TOP-&200) AND &FF00
  100 IF store%>&1000 store%=&1000
  110 DIM base% store%,w-10
  120 COLOUR 129:CLS
  130 PROCw(9,6,30,3,1,2)
  140 PROCc(4,"Pixel Editor")
  150 PROCstar(".")
  160 REPEAT
  170 PROCw(2,30,37,26,0,7)
  180 INPUTLINE'" Enter screen name or any * command"''" "file$
  190 IF ASC(file$)=42 PROCstar(file$):file%=0:GOTO 210
  200 IF file$="" file%=1 ELSE file%=FNcheckfile(file$)
  210 UNTIL file%>0
  220 VDU 26,12
  230 w%=4:h%=4
  240 magnif%=SQR(1024*1280/w%/h%/store%)+1.5
  250 W%=w%*magnif%
  260 H%=h%*magnif%
  270 wx%=1280 DIV magnif%
  280 wy%=1024 DIV magnif%
  290 ww%=(W% DIV w%-1)*w%
  300 hh%=H%-h%
  310 VDU 23;8202;0;0;0;
  320 VDU 20,12
  330 IF file$<>"" PROCoscli("LOAD "+file$+" FFFF3000")
  340 X%=0:Y%=0
  350 REPEAT
  360 PROCdist
  370 *SAVE wkfile FFFF3000 FFFF8000
  380 *FX 15,1
  390 IF doit%=2 PROCsave:CHAIN"MENU"
  400 PROCcopydown
  410 PROCclose
  420 *LOAD wkfile
  430 IF end%=1 PROCcopyup
  440 UNTIL FALSE
  450 :
  460 DEF FNcheckfile(file$)
  470 file%=0
  480 IF LEN(file$)<11 file%=OPENIN(file$)
  490 IF file%<=0 PRINT"File not found"
  500 CLOSE#file%
  510 =file%
  520 :
  530 DEF PROCdist
  540 GCOL 3,3
  550 doit%=0
  560 REPEAT
  570 PROCbox
  580 *FX 19
  590 PROCbox
  600 IF INKEY-84 PROCgrid
  610 IF INKEY-122 AND INKEY-1 X%=X%+W% ELSE IF INKEY-122 X%=X%+w%
  620 IF INKEY-26 AND INKEY-1 X%=X%-W% ELSE IF INKEY-26 X%=X%-w%
  630 IF INKEY-58 AND INKEY-1 Y%=Y%+H% ELSE IF INKEY-58 Y%=Y%+h%
  640 IF INKEY-42 AND INKEY-1 Y%=Y%-H% ELSE IF INKEY-42 Y%=Y%-h%
  650 IF INKEY-74 doit%=1
  660 IF INKEY-106 doit%=2
  670 IF X%<0 X%=0
  680 IF Y%<0 Y%=0
  690 IF X%+wx%>1280 X%=1280-wx%
  700 IF Y%+wy%>1024 Y%=1024-wy%
  710 UNTIL doit%
  720 ENDPROC
  730 :
  740 DEF PROCbox
  750 MOVE X%,Y%
  760 PLOT 13,X%+wx%,Y%
  770 PLOT 13,X%+wx%,Y%+wy%
  780 PLOT 13,X%,Y%+wy%
  790 PLOT 13,X%,Y%
  800 ENDPROC
  810 :
  820 DEF PROCcopydown
  830 b%=base%
  840 FOR i%=X% TO X%+wx% STEP w%
  850 FOR j%=Y% TO Y%+wy% STEP h%
  860 ?b%=POINT(i%,j%)
  870 b%=b%+1
  880 IF b%>base%+store% PRINT"Indirection error":STOP
  890 NEXT:NEXT
  900 ENDPROC
  910 :
  920 DEF PROCcopyup
  930 b%=base%
  940 FOR i%=X% TO X%+wx% STEP w%
```

continued ►

◀ continued

```
  950 FOR j%=Y% TO Y%+wy
% STEP h%
  960 GCOL 0,?b%
  970 PLOT 69,i%,j%
  980 b%=b%+1
  990 NEXT:NEXT
 1000 ENDPROC
 1010 :
 1020 DEF PROCclose
 1030 PROCbox
 1040 PROCdisplay
 1050 x%=0:y%=0
 1060 end%=0
 1070 *FX 4,1
 1080 *FX 15,1
 1090 REPEAT
 1100 PROCcursor
 1110 *FX 19
 1120 K%=GET
 1130 PROCcursor
 1140 IF K%=137 x%=x%+W%
 1150 IF K%=136 x%=x%-W%
 1160 IF K%=139 y%=y%+H%
 1170 IF K%=138 y%=y%-H%
 1180 IF K%=13 end%=1
 1190 IF K%=127 end%=2
 1200 IF x%<0 x%=0
 1210 IF y%<0 y%=0
 1220 IF x%>=1280 x%=x%-
W%
 1230 IF y%>=1024 y%=y%-
H%
 1240 IF K%>=48 AND K%<=
57 PROCcolour(K%-48)
 1250 IF K%>=65 AND K%<=
70 PROCcolour(K%-55)
 1260 UNTIL end%
 1270 *FX 4,0
 1280 ENDPROC
 1290 :
 1300 DEF PROCdisplay
 1310 b%=base%
 1320 FOR i%=0 TO wx%*ma
gnif% STEP W%
 1330 FOR j%=0 TO wy%*ma
gnif% STEP H%
 1340 GCOL 0,?b%
 1350 MOVE i%,j%
 1360 MOVE i%+ww%,j%
 1370 PLOT 85,i%,j%+hh%
 1380 PLOT 85,i%+ww%,j%+
hh%
 1390 b%=b%+1
 1400 NEXT:NEXT
 1410 ENDPROC
 1420 :
 1430 DEF PROCcursor
 1440 GCOL 3,3
 1450 MOVE x%,y%
 1460 PLOT 13,x%+ww%,y%
 1470 PLOT 13,x%+ww%,y%+
hh%
 1480 PLOT 13,x%,y%+hh%
 1490 PLOT 13,x%,y%
 1500 ENDPROC
 1510 :
 1520 DEF PROCcolour(k%)
 1530 GCOL 0,k%
 1540 MOVE x%,y%
 1550 MOVE x%+ww%,y%
 1560 PLOT 85,x%,y%+hh%
 1570 PLOT 85,x%+ww%,y%+
hh%
 1580 b%=base%+x% DIV W%
*(wy% DIV h%+1)+y% DIV H
%
 1590 IF b%>base%+store%
 PRINT"Indirection error
":STOP
 1600 ?b%=k%
 1610 ENDPROC
 1620 :
 1630 DEF PROCoscli($bas
e%)
 1640 LOCAL X%,Y%
 1650 X%=base%:Y%=base%
DIV 256
 1660 CALL &FFF7
 1670 ENDPROC
 1680 :
 1690 DEF PROCgrid
 1700 FOR P%=256 TO 1024
 STEP 256
 1710 MOVE 0,P%:DRAW 128
0,P%
 1720 NEXT P%
 1730 FOR Q%=256 TO 1280
 STEP 256
 1740 MOVE Q%,0:DRAW Q%,
1024
 1750 NEXT Q%
 1760 ENDPROC
 1770 :
 1780 DEF PROCstar(star$
)
 1790 VDU 28,0,24,39,9
 1800 COLOUR 0:COLOUR 13
1:CLS
 1810 PROCoscli(star$)
 1820 ENDPROC
 1830 :
 1840 DEF PROCsave
 1850 VDU 20,26,12
 1860 INPUT"Filename for
 save : "save$
 1870 PROCoscli("RENAME
wkfile "+save$)
 1880 ENDPROC
 1890 :
 1900 DEF PROCc(y,t$)
 1910 VDU 26,31,20-LENt$
/2,y
 1920 FOR z=1 TO LENt$
 1930 ?w=ASCMID$(t$,z,1)
 1940 X%=w:Y%=w DIV 256
 1950 A%=&A:CALL &FFF1
 1960 VDU 23,224,w?1,w!1
;w!2;w!3;w?4
 1970 VDU 23,225,w?5,w!5
;w!6;w!7;w?8
 1980 VDU 224,8,10,225,1
1:NEXT
 1990 ENDPROC
 2000 :
 2010 DEF PROCw(l,d,r,u,
p,q)
 2020 VDU 24,l*32-16;(31
-d)*32-16;(r+1)*32-16;(3
2-u)*32-16;
 2030 GCOL 0,131:CLG
 2040 VDU 24,l*32-12;(31
-d)*32-12;(r+1)*32-20;(3
2-u)*32-20;
 2050 GCOL 0,128:CLG
 2060 COLOUR p:COLOUR 12
8+q
 2070 VDU 28,l,d,r,u,12:
ENDPROC
```

Listing 3. The full screen editor should be saved as "SEDITOR"

```
   10 REM The Moving Pic
ture Program
   20 REM Full Screen Ed
itor
   30 REM by M J Sherrat
t
   40 REM for BBC B/B+/M
 with discs
   50 REM (c) Acorn User
 August 1986
   60 :
   70 MODE 1
   80 ON ERROR IF ERR=17
 CHAIN"MENU" ELSE VDU 7:
REPORT:PRINT" - press a
key":any=GET:RUN
   90 DIM oscli% 50,stor
e% &280
  100 DIM image% &400
  110 *FX 4,1
  120 VDU 23;8202;0;0;0;
  130 COLOUR 128:CLS
  140 COLOUR 3:GCOL 3,3
  150 PROCsvar
  160 mode$="Load":b$="1
"
  170 PROCflnm
  180 IF mode$="" THEN C
LS
  190 PROCsedd
  200 REPEAT
  210 PROCsedk
  220 IF INKEY-68 PROCch
fn
  230 IF INKEY-82 mode$=
"Save":PROCsdsv
  240 IF INKEY-87 mode$=
"Load":PROCchfn:PROCsdsv
  250 IF INKEY-66 mode$=
"Save":PROCsedd:PROCflnm
:PROCsedd
  260 IF INKEY-88 mode$=
"Load":PROCsedd:PROCflnm
:PROCsedd
  270 UNTIL FALSE
  280 END
  290 :
  300 DEF PROCsedk
  310 IF INKEY-58 AND Y%
<=736 PROCsedd:Y%=Y%+32:
PROCsedd:st%=st%-&280
```

continued ▶

◀ **Dodo listing 3 continued**

```
320 IF INKEY-42 AND Y%>=32 PROCsedd:Y%=Y%-32:PROCsedd:st%=st%+&280
330 IF INKEY-122 AND X%<=1008 PROCsedd:X%=X%+16:PROCsedd:st%=st%+&8
340 IF INKEY-26 AND X%>=16 PROCsedd:X%=X%-16:PROCsedd:st%=st%-&8
350 ENDPROC
360 :
370 DEF PROCsedd
380 MOVE X%,Y%
390 PLOT 21,X%+256,Y%
400 PLOT 21,X%+256,Y%+256
410 PLOT 21,X%,Y%+256
420 PLOT 21,X%,Y%
430 ENDPROC
440 :
450 DEF PROCsdsv
460 IF b$="QUIT" THEN mode$=""
470 PROCsedd
480 IF mode$="Save" PROCmmov:PROCoscli("SAVE "+file$+STR$(F%)+" "+STR$~image%+" +400"):F%=F%+1
490 IF mode$="Load" PROCoscli("LOAD "+file$+STR$(F%)+" "+STR$~image%):PROCmmov
500 PROCsedd
510 ENDPROC
520 :
530 DEF PROCmmov
540 FOR A%=0 TO 7
550 FOR I%=0 TO &7F STEP 4
560 IF mode$="Save" THEN !(image%+I%+(&80*A%))=!(st%+I%+(&280*A%))
570 IF mode$="Load" THEN !(st%+I%+(&280*A%))=!(image%+I%+(&80*A%))
580 NEXT:NEXT
590 ENDPROC
600 :
610 DEF PROCflnm
620 *FX 21
630 IF b$<>"1" THEN PROCstor("<")
640 PRINTTAB(30,0);mode$
650 REPEAT
660 PRINTTAB(0,0);
670 INPUT"Enter file name: "a$
680 UNTIL LEN(a$)<8
690 IF a$="" THEN mode$=""
700 IF mode$="Save" THEN PROCstor(">"):PROCoscli("SAVE "+a$+" 3000 8000")
710 IF mode$="Load" THEN PROCoscli("LOAD "+a$+" 3000")
720 X%=0:Y%=768
730 st%=&3000
740 IF b$<>"1" THEN PROCstor(">")
750 ENDPROC
760 :
770 DEF PROCstor(a$)
780 FOR A%=0 TO &278 STEP 4
790 IF a$="<" THEN !(store%+A%)=!(&3000+A%)
800 IF a$=">" THEN !(&3000+A%)=!(store%+A%)
810 NEXT A%
820 ENDPROC
830 :
840 DEF PROCchfn
850 *FX 21
860 PROCsedd
870 PROCstor("<")
880 PRINTTAB(0,0)"ANIDT";
890 REPEAT
900 *FX 21
910 IF F%<10 PRINTTAB(5,0);"0";F% ELSE PRINTTAB(5,0);F%
920 IF INKEY-58 F%=F%+1
930 IF INKEY-42 F%=F%-1
940 IF F%<1 F%=1
950 IF F%>99 F%=99
960 IF INKEY-82 OR INKEY-87 e$="END"
970 IF INKEY-74 e$="END":b$="QUIT"
980 TIME=0:REPEAT UNTIL TIME=10
990 UNTIL e$="END"
1000 PROCstor(">")
1010 e$="":b$=""
1020 PROCsedd
1030 ENDPROC
1040 :
1050 DEF PROCsvar
1060 mode$=""
1070 F%=1
1080 e$="":a$="":b$=""
1090 X%=0:Y%=768
1100 file$="ANIDT"
1110 ENDPROC
1120 :
1130 DEF PROCoscli($oscli%)
1140 LOCAL X%,Y%
1150 X%=oscli%:Y%=oscli% DIV 256
1160 CALL &FFF7
1170 ENDPROC
```

Listing 4. Save the data editor as "DATEDIT"

```
10 REM Data Editor
20 REM by M J Sherratt
30 REM for BBC B/B+/M with discs
40 REM (c) Acorn User August 1986
50 :
60 DIM col%(3),w 10
70 DIM ord% 254,oscli% 50
80 DIM data% 255
90 seq%=data%+&D
100 @%=0
110 MODE 1
120 VDU 23,1,0;0;0;0;
130 COLOUR 129:CLS
140 PROCw(2,6,37,3,1,2)
150 PROCc(4,"The Moving Picture Program")
160 PROCw(7,11,31,8,1,2)
170 PROCc(9,"Data Editor")
180 PROCw(7,15,31,13,0,7)
190 PRINT
200 REPEAT
210 INPUT" Number of pictures: "npic%
220 UNTIL npic%>0 AND npic%<27
230 ?data%=npic%
240 $(data%+1)=STRING$(8," ")
250 REPEAT
260 CLS
270 PRINT
280 INPUT" Data filename: "file$
290 UNTIL LENfile$>0 AND LENfile$<8
300 $(data%+1)=file$
310 CLS:PRINT
320 INPUT" Load filename: "file$
330 PROCw(7,21,31,13,0,7)
340 PRINT 'SPC(5);"Colour Options"
350 PRINT SPC(3);"(Choose 0,1,2 or 3)"'
360 FOR L%=0 TO 3
370 PRINTSPC(2);"VDU 19,";L%;
380 INPUT ","col%(L%)
390 ?(data%+9+L%)=col%(L%)
400 NEXT
410 CLS
420 L%=0
430 PRINT'" Picture Sequence"'
440 REPEAT
450 PRINT" Picture number ";L%+1;
460 INPUT": " tord%: ord%?L%=tord%
470 ?(seq%+L%)=ord%?L%
480 L%=L%+1
490 UNTIL tord%=0
500 ?(seq%+(L%-1))=&FF
510 PROCw(2,26,38,13,0,7)
```

continued ▶

◀ continued

```
  520 PRINT'SPC(5)"Data Summary"
  530 PRINTSPC(5)"-------------"
  540 PRINT'SPC(5)"Number of files: ";?data%
  550 PRINT SPC(5)"Filename: "$(data%+1)
  560 PRINT'SPC(5)"Colours:";
  570 PRINT"0=";data%?9;",1=";data%?10;
  580 PRINT",2=";data%?11;",3=";data%?12
  590 PRINT'SPC(5)"Picture sequence: "'SPC(5);
  600 L%=0
  610 REPEAT
  620 IF ?(seq%+L%)<>255 PRINT;?(seq%+L%);",";
  630 L%=L%+1
  640 UNTIL ?(seq%+L%)=255
  650 :
  660 PROCw(16,30,23,28,1,2)
  670 PRINT'" Okay?"
  680 REPEAT
  690 A$=GET$:UNTIL A$="Y" OR A$="N"
  700 IF A$="N" THEN RUN
  710 PROCoscli("SAVE "+file$+" "+STR$~data%+" +100")
  720 CHAIN"MENU"
  730 :
  740 DEF PROCoscli($oscli%)
  750 X%=oscli%:Y%=oscli% DIV 256
  760 CALL &FFF7:ENDPROC
  770 :
  780 DEF PROCc(y,t$)
  790 VDU 26,31,20-LENt$/2,y
  800 FOR z=1 TO LENt$
  810 ?w=ASCMID$(t$,z,1)
  820 X%=w:Y%=w DIV 256
  830 A%=&A:CALL &FFF1
  840 VDU 23,224,w?1,w!1;w!2;w!3;w?4
  850 VDU 23,225,w?5,w!5;w!6;w!7;w?8
  860 VDU 224,8,10,225,11:NEXT
  870 ENDPROC
  880 :
  890 DEF PROCw(l,d,r,u,p,q)
  900 VDU 24,l*32-16;(31-d)*32-16;(r+1)*32-16;(32-u)*32-16;
  910 GCOL 0,131:CLG
  920 VDU 24,l*32-12;(31-d)*32-12;(r+1)*32-20;(32-u)*32-20;
  930 GCOL 0,128:CLG
  940 COLOUR p:COLOUR 128+q
  950 VDU 28,l,d,r,u,12:ENDPROC
```

Listing 5. Combiner program. This should be saved as "COMBINE"

```
   10 REM Combiner
   20 REM by M J Sherratt
   30 REM for BBC B/B+/M with discs
   40 REM (c) Acorn User August 1986
   50 :
   60 MODE 1
   70 HIMEM=&2900
   80 DIM oscli% 40,data% 255
   90 INPUT"Name of loader : "file$
  100 PROCoscli("LOAD "+file$+" "+STR$~data%)
  110 INPUT"Starting picture : "st%
  120 N%=?data%
  130 RESTORE 270
  140 FOR M%=st% TO st%+N%-1
  150 READ b$
  160 b$=b$+"00"
  170 PROCoscli("LOAD ANIDT"+STR$(M%)+" "+b$)
  180 NEXT M%
  190 READ b$
  200 PROCoscli("SAVE "+$(data%+1)+" 2900 "+b$+"00")
  210 CHAIN"MENU"
  220 :
  230 DEF PROCoscli($oscli%)
  240 X%=oscli%:Y%=oscli% DIV 256
  250 CALL &FFF7:ENDPROC
  260 :
  270 DATA"29","34","38","3C","40","44","48","4C","50","54","58","5C","60","64","68","6C","70","74","78","7C"
```

Listing 6. Animator should be saved as "ANIMATR"

```
   10 REM Animator
   20 REM by M J Sherratt
   30 REM for BBC B/B+/M with discs
   40 REM (c) Acorn User August 1986
   50 :
   60 ON ERROR CHAIN"MENU"
   70 MODE 1
   80 HIMEM=&2900
   90 DIM oscli% 50,data% 255,w 10
  100 COLOUR 129:CLS
  110 PROCw(10,7,30,4,1,2)
  120 PROCc(5,"The Animator")
  130 PROCw(8,15,33,13,1,2)
  140 PRINTTAB(12,14)
  150 INPUT" Loader file name: "file$
  160 PROCoscli("LOAD "+file$+" "+STR$~data%)
  170 VDU 23,0,1,16,0;0;0;
  180 VDU 23,0,6,8,0;0;0;
  190 VDU 23,0,2,70,0;0;0;
  200 VDU 23,0,7,25,0;0;0;
  210 VDU 19,0,data%?9,0,0;
  220 VDU 19,1,data%?10,0,0;
  230 VDU 19,2,data%?11,0,0;
  240 VDU 19,3,data%?12,0,0;
  250 X%=70:Y%=25
  260 de%=10
  270 np%=?data%
  280 PROCmcode
  290 PROCoscli("LOAD "+$(data%+1)+" 2900")
  300 REPEAT
  310 ad%=data%?&D
  320 Z%=data%+&D
  330 REPEAT
  340 IF ad%<26 THEN FOR I%=1 TO ad%:READ np%:NEXT:RESTORE
  350 ?&71=np%
  360 ?&70=0
  370 IF ad%<26 THEN CALL anim
  380 IF INKEY-58 Y%=Y%+1
  390 IF INKEY-42 Y%=Y%-1
  400 IF INKEY-26 X%=X%+1
  410 IF INKEY-122 X%=X%-1
  420 VDU 23,0,2,X%,0;0;0;
```

continued ▶

◀ **Dodo listing 6 continued**

```
 430 VDU 23,0,7,Y%,0;0;
0;
 440 IF INKEY-88 de%=de
%-1
 450 IF INKEY-24 de%=de
%+1
 460 FOR I%=0 TO de%:NE
XTI%
 470 RESTORE
 480 Z%=Z%+1
 490 ad%=?Z%
 500 UNTIL ad%=&FF
 510 UNTIL FALSE
 520 :
 530 DEF PROCmcode
 540 P%=&C00
 550 [OPT 0
 560 .anim
 570 LDX #&00
 580 STX &80
 590 LDX #&30
 600 STX &81
 610 LDX #0
 620 .lp2
 630 .st
 640 LDY #0
 650 .lp1
 660 LDA (&70),Y
 670 STA (&80),Y
 680 INY
 690 CPY #&80
 700 BNE lp1
 710 CLC
 720 LDA #&80
 730 ADC &80
 740 STA &80
 750 LDA #&00
 760 ADC &81
 770 STA &81
 780 CLC
 790 LDA #&80
 800 ADC &70
 810 STA &70
 820 LDA #0
 830 ADC &71
 840 STA &71
 850 INX
 860 CPX #8
 870 BNE lp2
 880 RTS
 890 ]ENDPROC
 900 :
 910 DEF PROCoscli($osc
li%)
 920 LOCAL X%,Y%
 930 X%=oscli%:Y%=oscli
% DIV 256
 940 CALL &FFF7:ENDPROC
 950 :
 960 DEF PROCc(y,t$)
 970 VDU 26,31,20-LENt$
/2,y
 980 FOR z=1 TO LENt$
 990 ?w=ASCMID$(t$,z,1)
 1000 X%=w:Y%=w DIV 256:
A%=&A
 1010 CALL &FFF1
 1020 VDU 23,224,w?1,w!1
;w!2;w!3;w?4
 1030 VDU 23,225,w?5,w!5
;w!6;w!7;w?8
 1040 VDU 224,8,10,225,1
1:NEXT
 1050 ENDPROC
 1060 :
 1070 DEF PROCw(l,d,r,u,
p,q)
 1080 VDU 24,l*32-16;(31
-d)*32-16;(r+1)*32-16;(3
2-u)*32-16;
 1090 GCOL 0,131:CLG
 1100 VDU 24,l*32-12;(31
-d)*32-12;(r+1)*32-20;(3
2-u)*32-20;
 1110 GCOL 0,128:CLG
 1120 COLOUR p:COLOUR 12
8+q:
 1130 VDU 28,l,d,r,u,12
 1140 ENDPROC
 1150 :
 1160 DATA &29,&34,&38,&
3C,&40,&44,&48,&4C,&50,&
54,&58,&5C,&60,&64,&68,&
6C,&70,&74,&78,&7C
```

See Pictures in Print, page 154

Listing 1. Colour-Jet 132 test. NB: WIDTH = 20

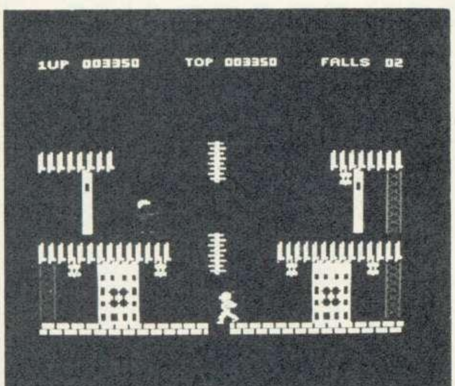
```
   10 REM Integrex C
olour-Jet 132
   20 REM Printer Te
st
   30 REM by Ron Fox
   40 REM for BBC B/
B+/E/M
   50 REM (c) Acorn
User August 1986
   60 VDU 2
   70 PROCchars
   80 PROCfonts
   90 PROCbackground
  100 PROCbitimage
  110 PROCgraphimage
  120 VDU 3
  130 END
  140 DEF PROCfonts
  150 c=0
  160 VDU 1,27,1,68,
1,27,1,105
  170 PRINT''"CHARAC
TER FONTS"
  180 VDU 1,27,1,114
  190 REPEAT
  200 c=c+1
  210 IF c=1 THEN VD
U 1,27,1,105:PRINT"'
Normal' Characters"
ELSE VDU 1,27,1,105:
PRINT"'Italic' Chara
cters"
  220 VDU 1,27,1,106
,1,27,1,65
  230 PRINT"This is
printed NORMAL SIZE.
"
  240 VDU 1,27,1,123
,1,27,1,66
  250 PRINT"This is
printed in CONDENSED
 LETTERS."
  260 VDU 1,27,1,14,
1,27,1,67,1,27,1,102
  270 PRINT"This is
printed in CONDENSED
 DOUBLE WIDTH LETTER
S."
  280 VDU 1,27,1,124
,1,27,1,14,1,27,1,68
,1,27,1,99
  290 PRINT"This is
printed DOUBLE WIDTH
."
  300 VDU 1,27,1,47,
1,27,1,46,1,27,1,69,
1,27,1,103
  310 PRINT"This is
printed DOUBLE HEIGH
T."
  320 VDU 1,27,1,44,
1,27,1,61,1,27,1,70
  330 VDU 1,27,1,63:
PRINT"This is double
 size lettering."
  340 VDU 1,27,1,63:
PRINT"This is double
 size lettering."
  350 VDU 1,27,1,63,
1,27,1,46,1,27,1,64:
PRINT"This is double
 double size letteri
ng"
  360 VDU 1,27,1,63,
1,27,1,46,1,27,1,64:
PRINT"This is double
 double size letteri
ng"
  370 VDU 1,27,1,61,
1,27,1,47
  380 VDU 1,27,1,125
  390 UNTIL c=2
  400 VDU 1,27,1,126
  410 ENDPROC
  420 :
  430 DEF PROCbackgr
ound
  440 VDU 1,27,1,68:
PRINT"All the colour
s available"
  450 c=0:A%=64
  460 REPEAT
  470 c=c+1
  480 VDU 1,13,1,27,
1,A%
  490 IF c=2 THEN A%
=71:VDU 1,27,1,111
  500 VDU 1,27,1,A%:
PRINT"BLACK";
  510 VDU 1,27,1,65;
:PRINT" RED";
  520 VDU 1,27,1,66;
:PRINT" GREEN";
  530 VDU 1,27,1,67;
:PRINT" YELLOW";
  540 VDU 1,27,1,68;
:PRINT" BLUE";
  550 VDU 1,27,1,69;
:PRINT" MAGENTA";
  560 VDU 1,27,1,70;
:PRINT" CYAN";
  570 VDU 1,27,1,A%;
:PRINT" BLACK AGAIN"
  580 UNTIL c=2
  590 VDU 1,11,1,27,
1,114,1,10,1,10
  600 ENDPROC
  610 :
  620 DEF PROCbitima
ge
  630 c=0
  640 VDU 1,27,1,70,
1,27,1,105:PRINT" Bi
t Image Mode"
  650 VDU 1,27,1,106
  660 REPEAT
  670 FOR i=1 TO 5
  680 IF c=0 THEN x=
65 ELSE x=67
  690 IF c=2 THEN x=
66
  700 VDU 1,27,1,x,1
,27,1,&4B,1,3,1,40
  710 FOR j=1 TO 8
  720 FOR k=1 TO 20
  730 n=2^j-1
  740 VDU 1,n;
  750 NEXT k
  760 NEXT j
  770 VDU 1,10
  780 NEXT i
  790 c=c+1
  800 UNTIL c=3
  810 VDU 1,10,1,10,
1,10
  820 ENDPROC
  830 :
  840 DEF PROCgraphi
mage
  850 c=0
  860 REPEAT
  870 FOR n=1 TO 10
  880 FOR j=1 TO 20
  890 x=2^(n-1)
  900 IF c=0 THEN a=
89 ELSE a=90
  910 VDU 1,27,1,a,1
,x
  920 NEXT j
  930 NEXT n
  940 IF c=0 THEN B$
="640 DOTS" ELSE B$=
"1280 DOTS"
  950 VDU 1,27,1,105
  960 PRINT'SPC13;B$
;" per Line Colour G
raphic Image Mode"
  970 VDU 1,27,1,106
  980 c=c+1
  990 UNTIL c=2
 1000 ENDPROC
 1010 :
 1020 DEF PROCchars
 1030 VDU 1,27,1,105
 1040 PRINT'"Charact
er Set"'
 1050 VDU 1,27,1,106
 1060 @%=5
 1070 FOR N%=32 TO 2
55
 1080 A$=" "+CHR$(N%
)+"    "
 1090 IF (N% MOD 128
)<32 THEN A$=" ctrl"
 1100 IF (N% MOD 128
)=127 THEN A$=" del
"
 1110 PRINT N%;A$;
 1120 NEXT N%
 1130 ENDPROC
```

CHARTS

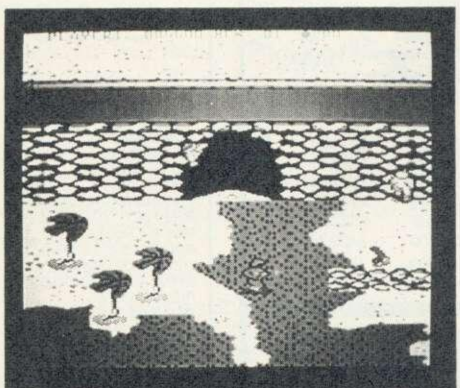
Check out the latest position of your favourite game

TOP 20 BBC MICRO GAMES

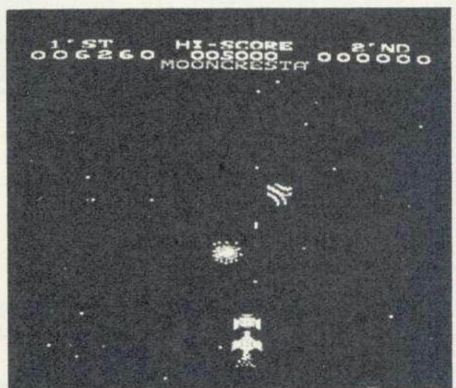
	Title	Publisher	Cassette	Disc	B +	Master	Reviewed
1	(1) Commando	Elite	£9.95	£14.95	*	*	August '86
2	(2) Winter Olympics	Tynesoft	£7.95	£8.95	*	*	–
3	(9) Tennis	Bug-Byte	£2.95	–	Yes	Yes	–
4	(–) Bruce Lee	US Gold	£9.95	£14.95	No	No	August '86
5	(3) Karate Combat	Superior	£8.95	£11.95	Yes	Yes	July '86
6	(5) Phantom Combat	Doctorsoft	£9.95	£12.95	Yes	Yes	February '86
7	(6) Citadel	Superior	£9.95	£11.95	Yes	No	March '86
8	(4) Computer Hits 10 Volume 2	Beau Jolly	£9.95	–	Yes	No	–
9	(–) Mooncresta	Incentive	£7.95	£9.95	Yes	No	August '86
10	(10) Strike Force Harrier	Mirrorsoft	£9.99	£12.95	Yes	No	January '86
11	(7) Yie Ar Kung Fu	Imagine	£9.95	£12.95	No	No	March '86
12	(17) Repton 2	Superior	£9.95	£11.95	Yes	*	December '85
13	(8) Way of the Exploding Fist	Melbourne House	£9.95	–	Yes*	Yes*	April '86
14	(–) Cosmic Battle Zones	US Gold	£9.95	–	No	No	–
15	(12) Lord of the Rings	Melbourne House	£15.95	–	*	*	–
16	(–) Combat Lynx	Durell	£8.95	–	Yes	*	September '85
17	(–) Steve Davis Snooker	CDS	£8.95	£12.95	No	*	May '86
18	(–) Match Day	Ocean	£9.95	–	Yes	Yes	January '86
19	(–) Scrabble	Leisure Genius	£12.95	£14.95	No	No	July '85
20	(–) Blockbusters	Macsen	£7.95	–	Yes	*	–



Bruce Lee: straight in at no. 4



Commando: hanging on at no. 1



Mooncresta: reviewed on page 139

TOP 10 ELECTRON GAMES

	Title	Publisher	Cassette	Disc	Reviewed
1	(6) Commando	Elite	£9.95	£14.95	August '86
2	(1) Computer Hits 10 Volume 2	Beau Jolly	£9.95	–	–
3	(4) Yie Ar Kung Fu	Imagine	£9.95	£12.95	March '86
4	(2) Way of the Exploding Fist	Melbourne House	£9.95	–	April '86
5	(–) Tennis	Bug-Byte	£2.95	–	–
6	(3) Walk the Plank	Mastertronic	£1.99	–	–
7	(–) Citadel	Superior	£9.95	£11.95	March '86
8	(7) Computer Hits 10	Beau Jolly	£9.95	–	July '86
9	(8) Spectipede	Mastertronic	£1.99	–	–
10	(9) Frak!	Aardvark	£7.90	–	June '86

COMPILED BY GALLUP/MICROSCOPE

*PLEASE CHECK B+/MASTER COMPATIBILITY BEFORE BUYING

REVIEWS

GAMES

CREST OF A WAVE?



'Mooncresta', Incentive Software, BBC B/B+, £7.95 (cassette), £9.95 (disc)

Just when you thought it was safe to buy another computer game, Incentive has released *Mooncresta*. I thought the days of the simple 'zap the aliens' games were over, but apparently Incentive had other ideas.

Mooncresta is based on the popular arcade game of the same name which I was completely hooked on and I spent a small fortune trying to beat it. I therefore looked forward with eager anticipation to being able to play it on my BBC micro.

When you do play the game, however, you soon realise that much of the appeal of the arcade version lay in its super-fast graphics and the lightning reactions that were needed to play it. This had been sadly lost in the move from arcade machine to the home micro, leaving the game rather repetitive and boring.

To be fair this is not the fault of the programmer. The game is well written and the graphics are easily up to the standard of the other games of this type. It's just that it is impossible to match the speed of the dedicated arcade game and without it *Mooncresta* becomes just one more of the zap and run games.

Before the game is played you are allowed to select the number of players (1 or 2) and may define the keys to be used. You also have the option to disable the sound effects.

The game consists of six levels, in the majority of which you have to shoot down aliens of one type or another. On the first level you are battling against 'cold eyes'. This race of invaders spends the first part of the battle grouped into a formation which swoops and dives around the screen. After a while, however, they split up and move independently. They do not actually fire at you but instead embark on suicide raids, diving at your ship.

After completing level one you are faced with the 'super flies', which are even easier to kill than the 'cold eyes'. They generally stay away from your ship and fly repeatedly into your laser.

Next comes a bonus level where you are invited to dock your space ship for a bonus score. This is very easy to do but does provide a nice diversion from the shoot-out which is returned to in level four.

The invaders in level four are very unstable. They keep disappearing and moving to other areas of the screen. This is quite challenging but is spoilt by the fact that they can reappear directly on your ship. This causes you to spontaneously explode for no apparent reason.

Unless you have a death-wish you will take cover at the side of the screen on the next level, as it is occupied by two giant meteors. These drop from either corner of the screen and you stand very little chance if you're caught in the middle. After several seconds of inactivity waiting for the meteors to finish, you reach the final level. This is possibly the easiest of all and involves you shooting down aliens called 'atomic piles' (there must be a joke in there somewhere).

One original part of the game is the protection used to deter would-be pirates – Incentive supplies each game with a small optical lens. This lens is used to read a two-character code off the screen which must be entered into the computer before the game can be played.

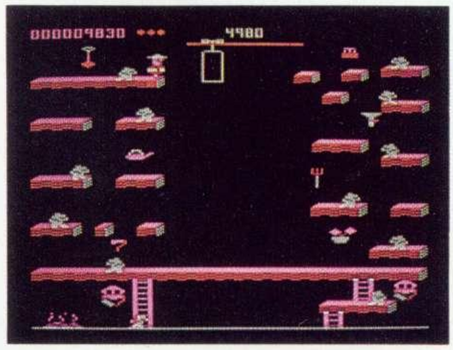
The characters are different each time the game is loaded and are impossible to read without the lens.

Incentive is offering a *Mooncresta* arcade machine to the first person who can get a score over 30,000.

To sum up, the game is very professionally written and the graphics and animation are excellent. However, there is nothing new or original about the game and without the thrill and excitement of the arcade version it has very little to offer. Personally I found that coping with the protection system was a lot more challenging than the game itself!

Mike Ginns

THE SON OF BOUNTY BOB



'Bounty Bob Strikes Back', US Gold, BBC B, £9.95 cassette, £14.95 disc

Like some of the good films, and most of the bad ones, Bounty Bob is back in a sequel. *Bounty Bob Strikes Back* is what can only be described as a glorified platforms and ladders game. The cover notes describe, in amusing detail, the history of Bounty Bob's situation and surroundings and add complexity to it all but the bottom line (as they say in the country of this game's origin) is that this is not a very inspired or inspiring game.

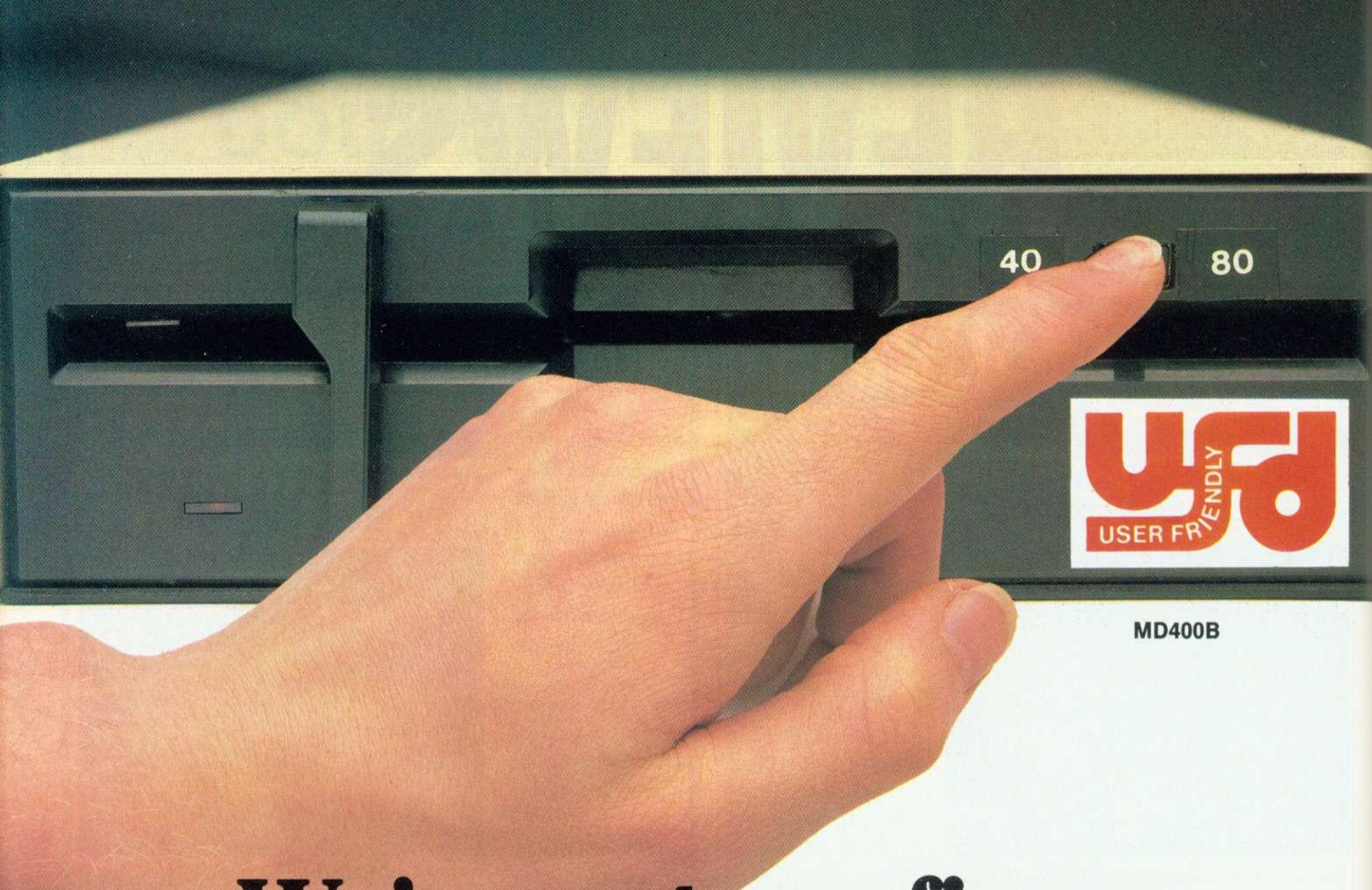
Among the platforms and ladders are all kinds of lifts, slides, suction tubes, and, of course, several species of nasties. You have to steer Bounty Bob around the whole screen to lay claim to every square inch of level surface, before moving on to the next screen.

Obviously situated somewhere in the mining area around Chernobyl (or maybe even Sellafield), all the caves are teeming with radioactivity and 'mutant organisms' abound. Rather strangely, Bounty Bob can be temporarily rendered immune to their lethal touch, and knock them off on contact, by eating radioactive bits and pieces left lying around by the previous tenant, Nuclear Ned.

For all this background colour, the game ends up being rather dull when it comes to actually playing it. If this is a prime example of US Gold's 'all American software', then I would suggest it remains all in America.

I wouldn't mind parting with a fiver for this kind of program – after all it is fast and smooth and diverting for a while – but ten quid is a bit steep.

Geoff Bains



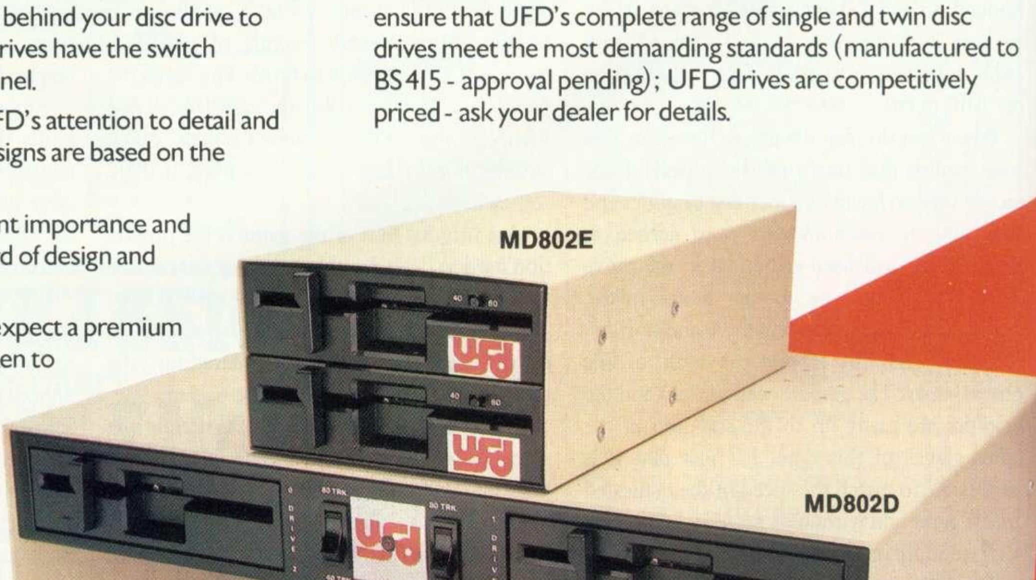
We've put our finger on a nagging little problem.

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REVIEWS

GAMES

SUPER JOE SHOOTS-EM-UP



'Commando', Elite Systems, BBC B, £9.95 (cassette), £14.95 (dsic)

At last, a game for Rambo fans which displays all the subtle intricacies of that film's plot. *Commando* is a shoot-em-up game very much of the old school that can nevertheless provide some hours of entertainment.

Commando puts you, as Super Joe the lone marauding GI unburdened by morals, in the thick of battle. Armed only with an automatic rifle with a seemingly endless supply of ammo and a decidedly more limited (though replenishable) supply of grenades you must plough ever-onwards into enemy territory.

There are plenty of trees and sand-bag emplacements to hide behind which is just as well. This area is filled with the enemy, all of whom appear to be as well equipped as you.

Compared to the plethora of excellent '3D' scrolling games around today *Commando* looks a little sad, presumably because of its close resemblance to the arcade original. The characters are cute enough but the scenery only scrolls vertically, and that is in jerks of a complete screenful. It won't scroll upwards so you can't retreat. The area off the sides of the screen is forever out of Super Joe's reach, although the enemy spring from all extremes of your monitor with little trouble and even less warning. The keyboard controls are easy enough to master but, rather strangely, if you elect to use the joystick you still have to grope for the space bar to throw a grenade.

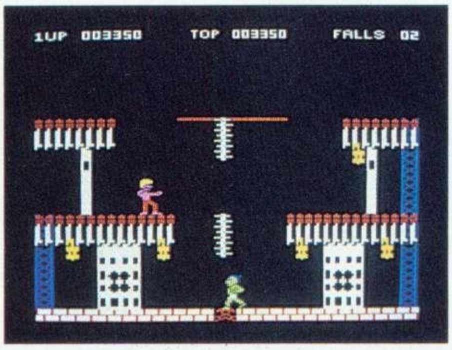
The object of the display of all this military might is to destroy as much as possible in the way of enemy soldiers and equipment, pick up boxes of grenades which they carelessly leave around, and make for the fortress.

Well, I never made it despite numerous forays. However, *Commando* offers much to please the confirmed electronic psychopath.

It is easy to start but not at all easy to complete and it offers a little of the elusive addictive qualities missing in so many games.

Geoff Bains

ORIENTAL SNAKES AND LADDERS



'Bruce Lee', US Gold, BBC B, £9.95 (cassette), £14.95 (disc)

Latest to join the martial arts combat games on the Beeb is *Bruce Lee* from US Gold. However, despite its name this game is not so much a karate or kung fu epic as a platform and ladders game with oriental overtones.

Bruce Lee is, of course, the hero of the piece and it is him that you manoeuvre around the bits of pagoda and lion statues that litter this region. Pitting his wits against you is the evil Wizard who is understandably upset at your invasion of his fortress.

In classic Bruce Lee style, rather than just fight you outright, the Wizard first sends his minions after you. First, the somewhat unlikely 'Green Yamo', then the well-armed 'Ninja' and finally the Wizard himself.

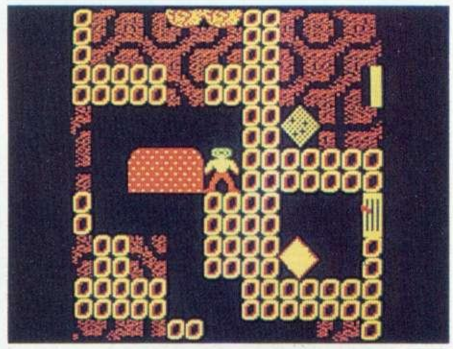
This game has none of the cartoon graphics and intricacies of movement of the likes of Superior Software's *Karate Combat*, but it is a sight easier actually to play and have fun with. The game is very fast with a good deal of concentration and fast reactions needed to get anywhere in the fight.

There are a few minor criticisms. The Green Yamo, particularly, shows incredible stupidity now and then, following the same path to receive a sharp punch in the mouth time after time. When Bruce knocks an opponent down he goes into a fast flicker, presumably in sympathy.

However, in many ways *Bruce Lee* is the ideal karate game. It is easy to get into, easy to clock up respectable scores of many thousands but still keeps you very much on the edge of your seat, waiting and eager for more.

Geoff Bains

REPTON REVISITED



'Repton 2', Superior Software, BBC B/B+/Master/Electron, £9.95 (cassette), £11.95 (disc). Electron only runs on disc

Reviewing *Repton 2* now (albeit on the Electron) is like turning up at the party after it has finished. Everyone who could have reviewed it already has, and anyone who was going to buy it bought it long ago. Also, I am informed, it has already won the Game of The Year Award for 1985. So what can your humble reviewer say that has not already been said?

All you have to do is move a green frog-like creature up, down, left or right along various corridors clearing soil, running into boulders and getting vaporised by so-called spirits. Also, there are monsters which burst out of eggs and you have to get the boulders to drop on them.

You reach the other 16 screens by walking into more coloured boxes, which also provide a useful escape when being chased by sea shells, sorry, spirits.

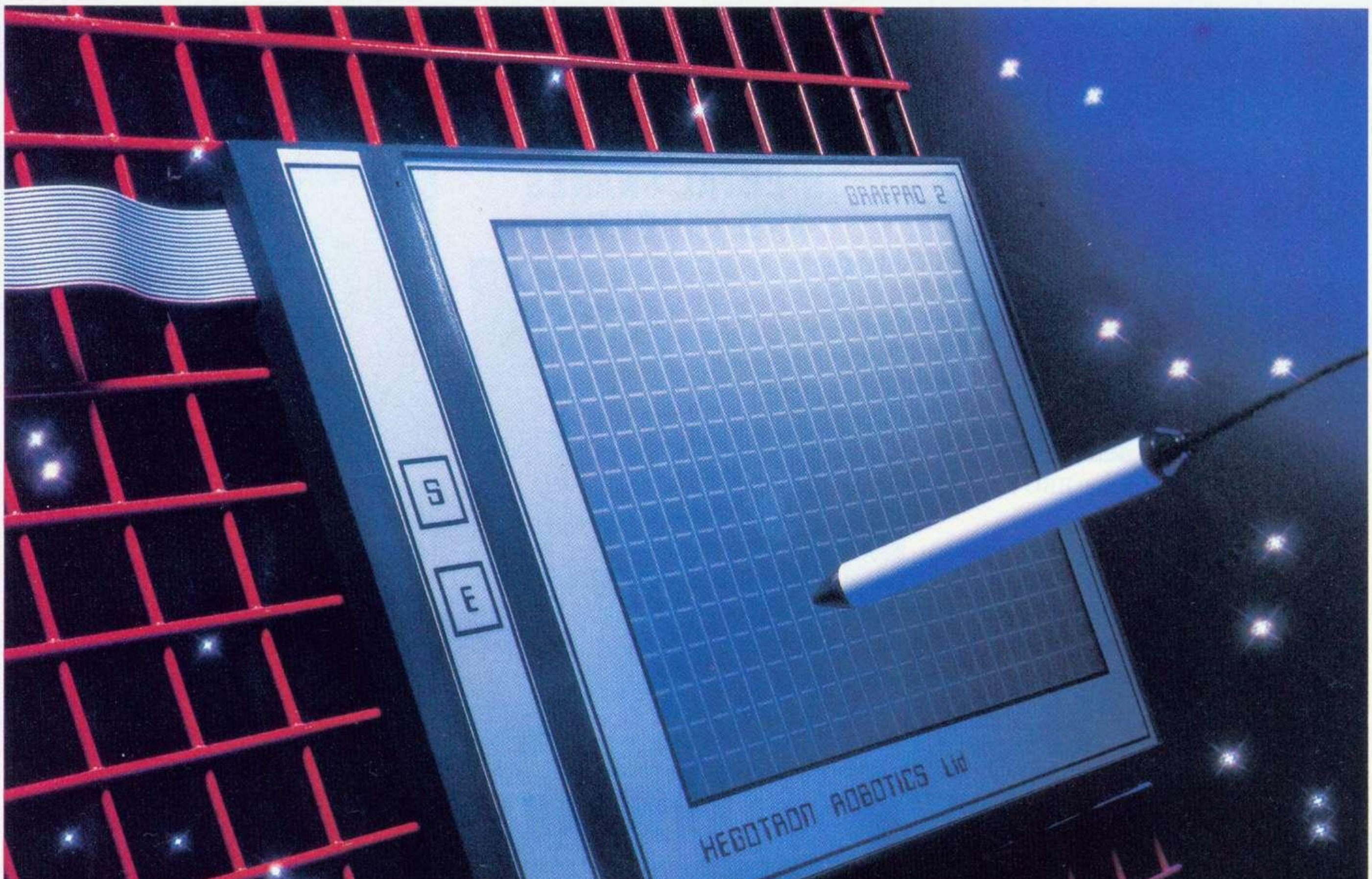
This game is a puzzle rather than a bug-zap. The trick seems to be to try to remember what happened the last time you moved that particular boulder. You win when you have collected thousands of bits of soil and diamonds and jigsaw pieces and also killed all the monsters and used all 64 transporters.

I didn't win, my three lives kept getting wiped out. What you should know is that the auto-destruct is not the dead give-away they tell you. What matters is to keep a sense of proportion, and try and forget the hair growing on the back of your hands.

All of which will make it completely obvious why this game was the Game of the Year. That and the fact that, for Electron owners at least, you do not have to hack off your Plus One to get it to work, though it is smoother if you do. Talking of smooth, where's that hair remover?

Mike Jackson

HARDWARE / SOFTWARE



PHOTOGRAPH BY DAVE KING

PICTURE POWER: DRAWING AND DESIGNING DIGITALLY

Home is where the art is: Chris Steele reviews Grafpad 2 and Novacad, two graphics systems for the Beeb

Grafpad 2, from Grafsales, is a fairly new and incredibly cheap digitising tablet for the BBC micro. The great advantage of using a tablet for computer graphics is that it is a form of input device which mimics the conventional method of drawing – stylus and flat surface.

Grafpad 2 plugs into the user port. On my machine this produced some interference on my monitor, and made the usually clear Trinitron TV image unreadable. The active area of the tablet is 25cm by 18cm, and two buttons are located to the side of this area and are used to start or stop drawing functions.

To use the tablet you need to have one hand on the buttons and one holding the stylus. I found this awkward and wish that Grafsales had fitted a microswitch in the tip or body of the stylus.

A disc-based graphics package comes with the tablet. It operates on the familiar 'icon' system in mode 1. Basic drawing tools include: line, spray (airbrush), circle, triangle, ellipse, square and rectangle. All functioned as expected except 'square' where the programming appeared to have gone a little astray – my squares kept floating up the screen when I was trying to fix their size.

A good flood fill routine allows you to use one of 32 predefined fill patterns and to rotate, mirror and invert these patterns; unfortunately I could not convince it to fill with just a plain colour. Text can be outline, solid or italic and can be drawn at any size and any angle. A 'tail'

function allows you to plot the letters on the screen so that they appear to be disappearing off into the distance.

A more useful utility allows you to create, edit, load and save a bank of 32 different icons. These can then be used on the drawing page.

Images can be saved to disc and printed on an Epson-compatible printer.

The software is described in a 14-page A5 manual which contains a number of errors.

The few problems I have mentioned tend to overshadow what could be an excellent peripheral. Some parts of the software are excellently done – for example, when you move the stylus very quickly the software smooths out the line to produce a clean curve with no 'corners'. Other parts were difficult to control. In particular there are few of the functions which make producing computer graphics so different from conventional drawing. Functions like copy, move, trace, zoom, save area, replace/delete colour, and grid lock are all missing.

A utilities disc is available for an extra £5 which allows you to incorporate a machine code routine in your own programs for reading the tablet.

At £59.50 Grafpad 2 has to be the cheapest, proper digitising tablet around. Despite my criticisms I would recommend it for use from your own software, or other graphics packages if they can be adapted.

NB: Grafsales was due to launch Grafpad 2 Plus at the beginning of June, priced £75.50 inc VAT and including software on ROM.

Any attempt to put a full CAD (computer-aided design) system on a standard BBC micro is doomed to failure, because the micro just doesn't have the memory and power needed – you'll have to look at something costing 10 to 100 times more. What *Novacad* does is give a flavour of what's possible.

A CAD system must store information about the lines which make up a drawing so that editing operations can act on these individual elements, and not on the pixels which make up the whole image when it is displayed on screen. *Novacad*, from Technomatic, fulfills this requirement and attempts to provide the sort of facilities which you might expect to find on a professional CAD system.

The system consists of a 16k ROM, utilities disc, and A5 reference manual. On a BBC B it operates in mode 4, whereas on a B+ or second processor modes 0 and 1 can be used.

When you initially enter the system the screen displays a small 'window' onto the drawing area, which is four windows wide by five high – this gives a total resolution of 960 by 810. You can move between the windows by using the CTRL key with the cursor keys.

A crosshair is controlled by the cursor keys. You can draw lines or arcs and all plotting can be performed on one of eight 'levels'. As you can control which levels are displayed, and how they are displayed, it is easy to use one level for construction lines and another for the lines of the drawing (for example).

All the drawing functions are easy to use and allow you to preview the line before it is fixed in place, but the circle drawing routine was rather slow. The last drawn element can be recalled by pressing the Copy key, and then moved to a new position. This makes it easy to draw images which contain repeated lines. Individual lines and arcs can be deleted by simply pointing to them and pressing the Delete key.

Normally the cursor jumps in predefined grid steps; individual steps are possible by pressing the Shift Lock key. A continuous readout of the horizontal and vertical distance of the cursor from the start of a line is available by pressing 'Q' and 'W' will display the boundary of the current window.

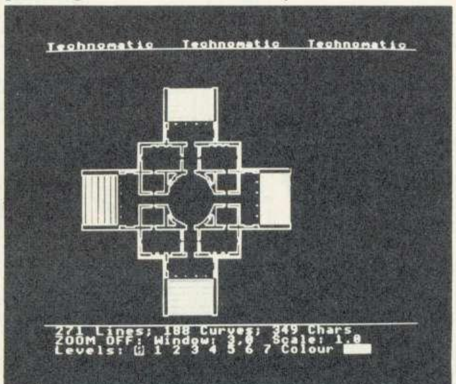


Figure 1: 'uses three-quarters of available memory'

A 'zoom' facility allows you to add minute detail to a drawing but as the printout facility is limited to the resolution of the whole drawing area, this detail is not printed.

One of the most useful facilities *Novacad* offers is the saving of elements of a drawing independently onto disc. These 'icons' are first drawn on screen in the normal way. Then you define the centre and area of the icon. All the lines which are bounded by this area are then saved onto a specially created icon file. Icons are recalled by using the function keys and they can be rotated (by 90 degree increments), mirrored, scaled, moved, and finally plotted onto the final drawing.

As an example, the illustration 'Villa Rotunda' (figure 1) was created by first drawing a quarter of the villa, then copying it in segments onto the icon file. The whole was then assembled by plotting these segments, in various attitudes, back into the drawing.

It's possible to have a large number of icons stored on disc. The function keys can be defined to call up just those needed for the particular drawing you are working on. These function key definitions can also be saved on disc and are recalled when you enter *Novacad.*

Text can only be displayed in the normal BBC micro character set, but can be rotated in 90 degree steps, and remains at the normal size when you use 'zoom'. A utilities facility allows you to save the present screen image to disc, clear the drawing area and display the whole drawing on a single screen.

Pressing the Tab key will display a menu which allows you to change certain system values and perform disc management functions. These include manipulating the icon file, building function key definitions, altering the grid and scale values, and setting default printer and hardware configurations.

The basic software only allows output to a dot matrix printer. To do this you first have to save your drawing to disc as a number of screen images. Although this task can be left unattended, once started, it did take about half an hour with a large drawing.

As I said at the beginning of this review the BBC B places heavy constraints on anyone trying to write CAD software. My plan of the Villa Rotunda uses about three-quarters of the available memory on a standard model B. The user interface of *Novacad* is awkward: you have to remember a large number of keys to call up the functions as the function keys are used for the icons. Many of the facilities were slow, and sometimes produced unpredictable results.

If you want to demonstrate what a basic CAD system is capable of, then *Novacad* is adequate. I would not recommend it for serious work, and it would be best used in colleges or schools, or where there are a large number of repeated elements and resolution is not paramount (PCB and kitchen design are two areas which spring to mind). Most important of all: buy yourself a plotter.

Grafpad 2, £59.50, is available from Grafsales Ltd, Unit Q2, Penfold Works, Imperial Way, Watford, Herts WD2 4YY. Tel: (0923) 43942

Novacad, £79; Tracker Ball/AMX Mouse, Novacad £99; Plotter utility programs £28.50 (prices exc VAT). Available from Technomatic, 15 Burnley Road, London NW10. Tel: 01-208 1177

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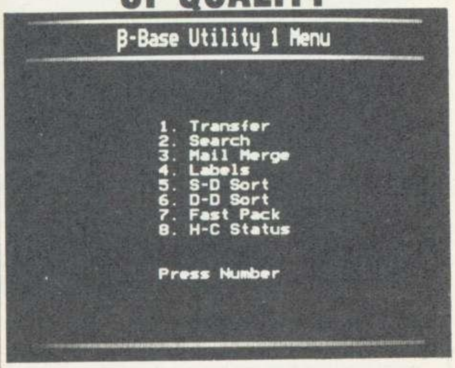
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ACCOUNTS OF QUALITY



'Beta-Accounts', Clares Micro Supplies, BBC B, £25

This is the first module of an integrated accounting suite of programs from Clares which has continued its habit of producing high quality disc-based systems, and this is more user friendly than several comparable systems I have tried.

This first contribution consists of 31 files of which 24 are essential parts of the system and the remainder are samples. The 'invoice and delivery note module' and 'transaction file' provide delivery notes, print a sales ledger with VAT details and the record of transactions. All these work very well and produce a serviceable, if rather simple, form of output.

Clares intends to release three more sets of programs, providing 'accounts receivable and statement generator', 'stock control', and 'accounts payable and nominal ledger'. These, when taken together, will give a similar range of facilities to the other integrated packages, though what is different and potentially exciting is the plan to link the suite with *Beta-Base* from Clares and *Ultracalc 2* from BBC Soft.

The idea of inter-compatibility between a range of accounting programs and a full database system is of major importance, as is the even more dramatic link with a high quality spreadsheet from another software house. Since only the first set is available and these links are not yet perfected, these claims cannot be tested, but if they work well Clares is to be congratulated.

This package consists of a single 80-track disc, together with a provisional 17-page manual, in a smart folder. Although the manual is reasonably easy to follow it calls for a fair amount of basic knowledge about accounts and micros.

To make use of the package you need a good monitor (for the 80-column output), at least two drives and an Epson-compatible printer. A more serious limitation is that you can only use the planned customer file and the stock control module if you have dual double-sided disc drives. While the reason for this is understandable, the user needs to think about this carefully before buying the first part of the integrated suite.

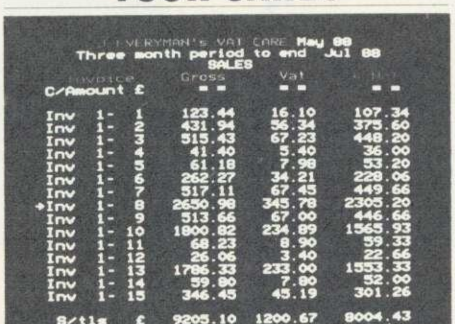
It is not possible to calculate exactly how many transactions the system can deal with, but it should cope with most small business needs: Clares reckons that an 80-track disc will allow 3000 invoice and credit note entries plus 1000 payment entries per month.

Altogether this is a useful and sensible package which will be suitable for many users. It promises to have real advantages over some of the competitors if one accepts a rather simple presentation and limited manual and the need for dual, double-sided and probably double-density disc drives.

It would be better to make a final judgement once the whole series and their links to *Beta-Base* and *Ultracalc 2* can be tested because that is the suite's strongest point.

Roger Carus

SQUIRREL AWAY YOUR CARES



'Cash Care', £11.95; 'Building Society Care', £9.95; 'VAT Care', £14.95; Squirrel Software, BBC B and Electron. Prices are for the cassette; discs available in any format for £2 extra

These are three separate well-written programs which lie between the personal finance and small business areas. Each does its job well and provides a useful, if limited, range of functions.

Cash Care is designed to keep a check on almost any kind of account where there are credit and debit transactions and although it is particularly suitable for bank and building society accounts it works equally well with credit records such as Barclaycard or Access. There are limits on its capacity and it will only take two separate accounts in a single file, but there is no reason why you should not have several files. Similarly each file can only relate to a one-year period, shown monthly. The program allows 40 categories of expenditure and 20 of income.

There is a facility to project your budget, to display any category in a three-dimensional bar chart or to print any account. Access is protected by a password which is visible when you enter it – so be warned!

Building Society Care covers some of the same ground but is designed for interest-earning accounts and would work with any savings account. It allows you to insert deposits and withdrawals on specific dates, and similarly to change interest rates. These in turn show interest earned and provide a check both on how things are going and also on the accuracy of calculations. If you think you could do better in another type of account it allows you to set up comparisons.

To make life easier you can either insert the data in response to prompts or direct into the spreadsheet which underlies the system. You can save the data and produce convenient print-outs showing all the changes.

VAT Care is quite different because it's a business package which has, it is claimed, been checked and approved by HM Customs and Excise. It is designed to produce the main totals needed for the quarterly VAT return.

It will produce two datafiles with 240 entries in each for sales and purchases which generate monthly figures showing the tax due, deductible, and relevant totals.

Accepting their limitations, all three are quite impressive and perform as well as much more expensive packages. While praising their cost it is only fair to say that this is in part due to the very cheap format of instructions for each in small stapled duplicated booklets – but they are adequate.

The review copies tested were all together on a single dual format disc and ran with no problems. It is rather a pity that this was not the standard presentation and selling at around £20 since the company would not lose much revenue and users would have more choice.

My only reservation about these programs is to wonder how many people want to double-check their various accounts when the banks, building societies and others provide such detailed statements already.

Roger Carus

ROMS

MONITORING YOUR PROGRESS

Michael Ginns casts his eye over the new machine code monitor from the BBC

The latest firmware release from BBC Soft is *Monitor*. It is a full machine code monitor and, like previous releases from BBC Soft, has been designed to be very easy to use. It allows even the beginner to write and debug machine code programs on the BBC micro.

Monitor is supplied as a 16k EPROM together with utility software. It is unusual in that it works on the BBC, BBC B+ and Master machines. It is also fully compatible with the Tube and a 'High memory' version is included in the package for use on the second processor.

When you first enter *Monitor* you are presented with the standard hex and ASCII memory dump found on most monitors. What sets it apart from the other ROMs is the clear screen layout and effective use of colour to highlight certain areas. The cursor keys move you around the memory area and locations may be changed by entering the new two-digit hex number. Alternatively ASCII entry may be selected where characters are typed directly into memory.

If present, sideways ROMs, second processor memory and even shadow RAM can be accessed as well as main memory.

Instead of the hex dump the memory can be interpreted as 6502 instructions and a disassembly of memory is produced. *Monitor* has been written to take account of the extra instructions present on the 65C02 and correctly disassembles all of these.

From the memory display mode all the other facilities provided by *Monitor* are accessed by pressing a corresponding function key.

To help remember which key does what, there is an area at the bottom of the screen which displays the function of each key. This information can be stepped through until you find the information you want.

A particularly nice feature incorporated in *Monitor* is the assembler which allows assembly instructions to be entered directly into memory. Labels can be used within the assembler to associate a name with a given location. There is a whole range of commands to save, load and manipulate these labels. In fact, *Monitor* already has defined within it labels for all the main operating system routines and system vectors. This makes programs much easier to enter and makes the code more readable. There were



***Monitor*'s hex and ASCII memory dump**

unfortunately two bugs in the assembler of the *Monitor* ROM I was using.

The first occurs when an error is made in entering a mnemonic beginning with an 'A', eg, ADD #10 instead of ADC #10. Instead of issuing the normal error message, for some obscure reason the system seizes up and Break has to be pressed.

A second more serious bug is that the assembler refuses to accept JMP instructions to zero page. If the instruction 'JMP address' is entered, where address is less than &100, the assembler aborts with an error. This proved to be very irritating especially when writing code which resides in the reserved user space between &70 and &80.

The other major facility provided in *Monitor* is the ability to execute machine code routines in a controlled way. The 6502 registers may all be defined before executing a routine, and up to eight breakpoints can be set to interrupt execution at given locations. Memory and registers can then be examined and modified before continuing to execute the routine.

Alternatively the code may be 'single stepped'. In this mode a single instruction is executed on every key press, which allows the execution of a routine to be traced very closely.

The format of the screen in single step mode is excellent. The values of all the 6502 registers are displayed as are the top six bytes of the 6502 stack. A small memory window is maintained which allows you to study the effect of the code being executed.

The rest of the screen is used to display any output generated by the routine being executed. Characters sent to this area are intelligently trapped and control codes are output as their hex equivalents. A facility is available which sends this output to another BBC micro via the RS423 port. This allows the program execution to be traced on one BBC micro while the screen output produced by the routine appears on the second Beeb.

Monitor's excellent utilities are supplied on tape with a program to transfer them to disc. The displays and commands used in the utilities have been designed to be consistent with those used in the *Monitor* ROM.

The main utilities supplied are listed in figure 1. You will notice that a text editor is included which allows assembly program text files to be created for use in the disc assembler. The editor is basic but is very useful for those who don't have a full wordprocessor.

Where *Monitor* really scores is in the amount of care that has obviously been put into making both the manual and the software easy to use. The layout of the screens and simple commands make *Monitor* ideal for the beginner at machine code, while the extensive facilities provided will also keep even the most advanced user happy.

The utilities are a real bonus. It is remarkable that such well-written and extensive software should be included as part of the package. I do not know of any other monitor ROM that comes with this level of support.

All in all, apart from the few minor bugs, a very well thought out product which is both easy to use and flexible, and contains some very powerful features.

Labels	Labels assembly label manipulation program
Reloc	Machine code relocator
MonEdit	Text editor to prepare assembly code on
Assemb	Disc assembler
DFSed	Disc utility including a sector editor
Mouse	Allows AMX Mouse to be used instead of cursor keys

Figure 1. *Monitor*'s main utilities

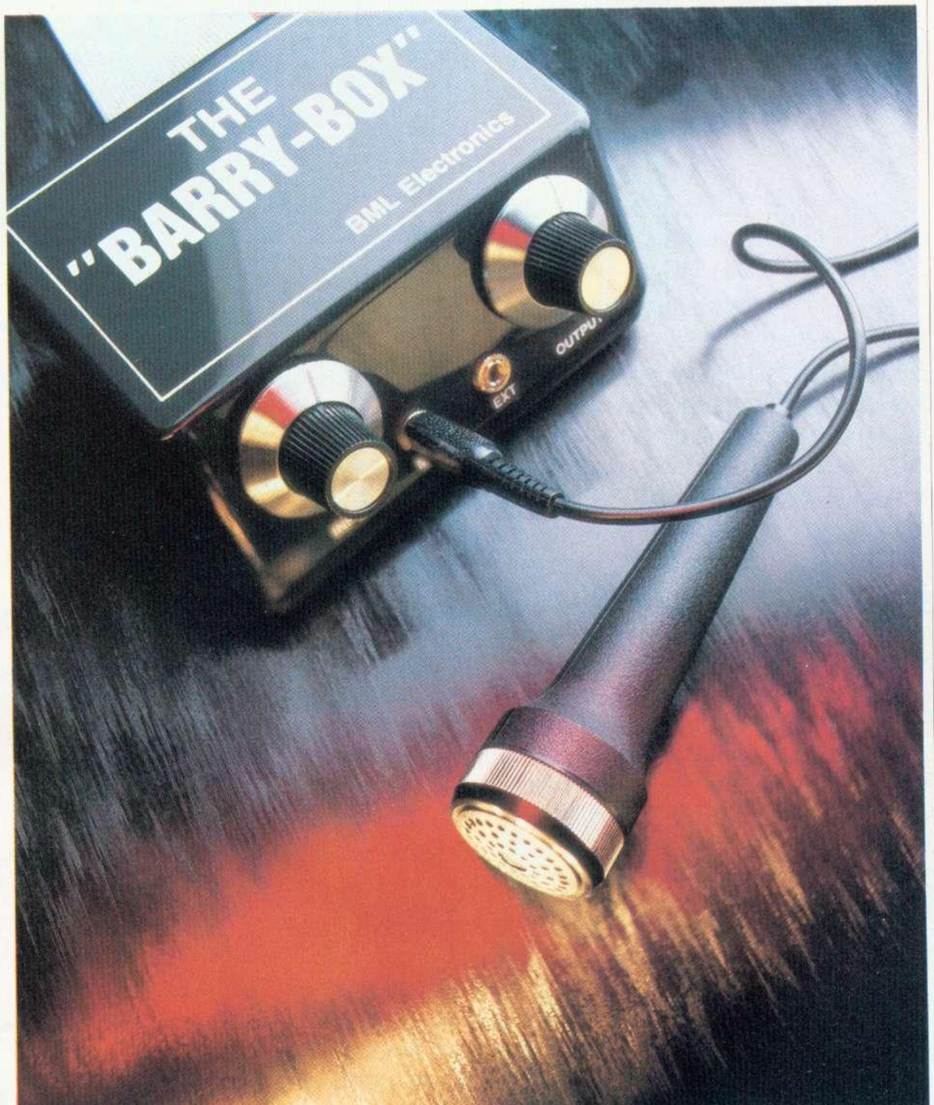
ISMEC Machine Code Monitor ROM, £39.95
BBC Soft, 35 Marylebone High Street, London W1M 4AA

PHOTOGRAPH BY DAVE KING

HARDWARE

A SOUND EXPERIMENT

Andy Finney plugs into the Barry Box to explore digitised sound



PHOTOGRAPH BY DAVE KING

With the music industry becoming more digitally obsessed and studios equipped with digital delay lines, echo chambers and pitch-shifters it seems all too likely that you may want your micro to follow into the world of digitally recorded sound.

Into this environment comes the Barry Box from BML Electronics in Bletchley. With a pair of fast analogue to digital (A-D) and digital to analogue (D-A) converters it turns a sound into a set of numbers. The numbers can be stored and changed in your BBC micro and then turned back into sound again.

The quality of a digital recording of a sound depends on how faithfully the sound can be represented by numbers. This boils down to two things: how fast the sound is sampled and the precision of the numbers storing the sound. The electrical signal from a microphone should be sampled at least twice the highest frequency in the signal. The numbers generated, representing the signal voltage at each sampling point, should have as many levels as possible. Professional digital audio samples at around 44kHz and generates 16-bit numbers (ie, 65,536 different levels). The Barry Box samples at a user-defined rate up to 40kHz and has 8-bit precision with 256 levels.

In terms of quality of recording this is pretty good, much better than the internal speaker on the micro will reproduce.

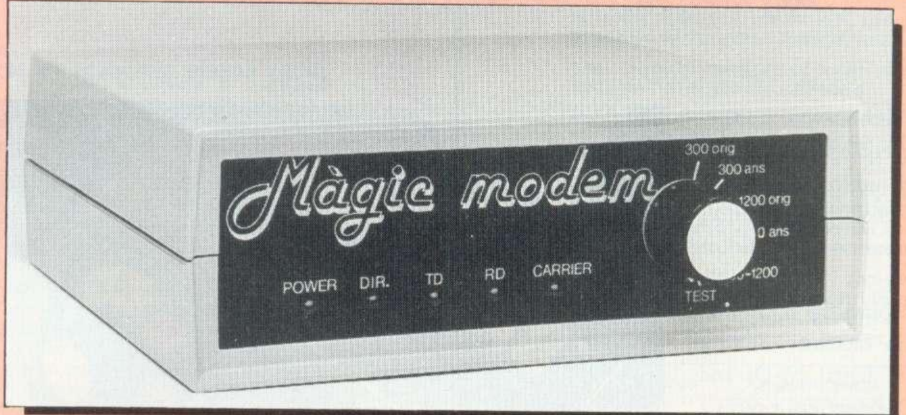
It must be said though that the Barry Box is not designed to be a digital sound recorder. In any case, a 40kHz sampling rate only records a second of sound for every 40k of memory used (ie, you don't store much on your BBC micro!) and for useful recording times of a few seconds you have to sample more slowly. This still produces reasonable quality and enables you to experiment with the sound stored digitally in your micro.

The box is 105 x 85 x 50mm and plugs into the 1MHz bus for control and the power outlet in the micro for power (5 volts). Here lies the only serious problem. The power comes out from the BBC micro on a jack plug. It is generally bad practice to put volts on a male connector, especially if there is a risk of shorting the power supply. In this case it is impossible to plug the jack into the box without shorting your power supply rail to chassis (through the 1MHz bus connector). BML warn you not to connect the box with the micro powered up but even a very brief short (such as caused by accidentally pulling the power jack out quickly) will crash the micro at the very least. The jack plug arrangement should be replaced and BML said it would look into this possibility.

BML thoughtfully provides a basic microphone and besides the microphone input (a miniature jack socket) and the 1MHz bus cable there is a second jack for output as well as two volume controls. One of these controls input levels, and is for some reason a linear law potentiometer, and the other logarithmically controls output levels. (As the ear's response to sound levels is logarithmic it is usual to use log potentiometers for volume controls.) The user guide has no information on input and output levels and impedances, although BML does recommend that a low impedance microphone is used. For better sound quality BML suggests using an external amplifier although you should keep the output level on the box turned low.

The Barry Box software comes in an EPROM and operates on two levels. First, in direct mode you operate the box by pushing function keys. Second, by using * commands and setting parameters in zero page (between &70 and &8F) you can operate the box from your own programs. Some examples of such

INTRODUCING THE BEEBUG MAGIC MODEM



In the March 1986 edition of BEEBUG we reviewed the Magic Modem. This is what we said:
"Using the software and the modem is simplicity itself"
"Simply a delight to use . . . performed perfectly . . . in my opinion the best terminal software yet for the BBC"

It was also reviewed on Micronet 800. They said:
"Lots of thought has gone into the design . . . certainly the best modem package for accessing Prestel via a Beeb so far!"

THE MODEM
Simply plug the modem into your computer with the lead provided and you are ready to go. Ideal for accessing Prestel, Micronet 800, Telecom Gold, Telelink, Homelink and hundreds of bulletin boards. Features auto dial and auto answer. You can even set up your own bulletin board with the Beebug Magic Modem. In fact this modem is already in use by several well known bulletin boards already.

THE SOFTWARE
Supplied with custom designed communications software supplied on a 16k rom written by Soft Machinery. This enables you to auto dial, and contact any of the services (Prestel, etc.) that you may require. The software is truly excellent and features a mailbox frame editor, telesoftware downloader, frame tagging, load, save, print, etc. all at the press of a function key.

FULLY BT APPROVED
This modem has undergone the rigorous British Telecom approval procedures. You have no worries about problems, incompatibilities or damage to your computer or phone which may be caused by unapproved equipment.

This is your guarantee of reliability and testifies to the highest manufacturing standards used in this modem.

APPROVED for use with Telecommunications systems run by British Telecommunications in accordance with the conditions in the instructions for use.

S/2908/3/G/500406

PRICE
Modem (inc. Auto Answer) software and lead £115 inc. VAT

Modem (inc. Auto Answer) and lead £99 inc. VAT

UK carriage £2.00

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75/1200
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applications are in the user guide. All the functions in direct mode have an equivalent in program mode.

There are two modes of recording. One is 'Triggered' where the recording starts when a sound is detected, but this tends to chop the front off non-percussive sounds. The second simply starts recording when the key is pressed. The length of recording depends on your sampling rate (set as time between samples) and the length of the buffer into which the sound is written. As the Box software will only function in the micro and not a second processor, buffer space is limited and mode 4 is used by the Barry Box direct mode.

To play the sound back you simply push a button and out it comes. When you first hear your voice saying 'Hello Mum' coming out of your micro speaker it is quite exciting – it makes a change from Kenneth Kendall! Another key combination plays it backwards.

Other keys allow you to look at the waveform (like a storage oscilloscope trace), look at its amplitude envelope and at its frequency spectrum. The first is fairly routine (although storage scopes usually cost a small fortune), the second is dubious (what you actually get looks more like a full-wave rectifier output than a true envelope), but the third is magic. It takes a bit of fiddling with parameters to get the best out of the spectrum display and in general it is not big enough on the screen – but to have a spectrum analyser, however rudimentary, for less than £100 is amazingly good value, never mind the other things you can do. A pure tone gives a sharp peak in the display whereas a percussive, noisy sound (like a hand clap) shows a broad distribution of frequencies.

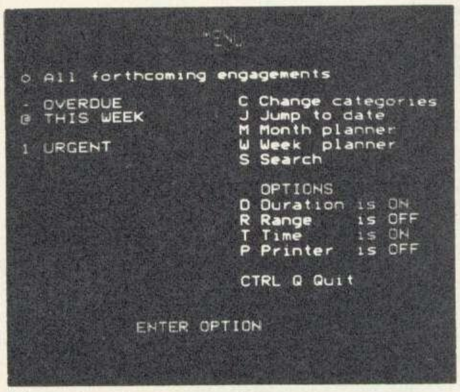
Since the box stores the sound as a series of numbers in the buffer representing the waveform, it is possible to write a sequence of numbers into the buffer, describing a waveshape, and have the box play the resulting sound. Other functions include a fast Epson screen dump, some rudimentary clean-up for the recorded sounds, and saving the buffer contents to sideways RAM or to disc.

At under £100 the Barry Box presents a fascinating tool for exploring digitised sound. The problem with the jack plug power lead should not detract from the value both for education and as a tool or toy in the home.

The Barry Box £79.95
BML Electronics, Unit 24, Larch Grove, Bletchley, Bucks MK2 2LL. Tel: (0908) 640805

A ROM TO HELP YOU ORGANISE YOUR LIFE

Simon Williams plans his appointments up to 1999 with Gemini's new computer diary



There have been several attempts to create an 'electronic diary' on a micro – a program which allows you to record appointments, notes and reminders. Most of these have been hampered by complex command structures and the need to load the program each time you want to use the diary.

While you can't easily get round loading the program Gemini's *Life and Business Organiser* (*LBO*) is available on ROM, offering almost instant access. True, the data file still has to be stored on disc, but in this case the total amount of data is of necessity small, and the system works very quickly.

Once the ROM has set up the data file for you, and you've entered the current date, all your urgent messages are displayed. 'Urgent' is a pre-defined category which allows you to flag important appointments. Messages are displayed on a mode 7 screen, numbered and dated, and there is a small menu of options at the bottom of the screen. These allow you to add, delete or update (change the date of) new appointments, display further screens or exit to the next screen.

The second screen shows overdue messages, which are calculated automatically from their attached dates. You are offered the same editing facilities as before.

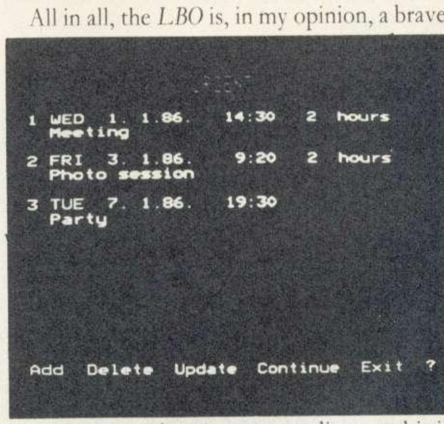
The third screen shows you forthcoming appointments for the next week, and again allows you to edit them. Exiting from this screen finally brings you to the main menu. From here you can select any of the three displays already mentioned, but also a week or month planner for any time up to 1999.

You can search for any word or part-word and all references to it from any part of the diary will be called up. You can also switch any of four options on and off. These define how entries are made into the diary and also provide printed copy.

One of the most useful features of the *LBO* is its ability to handle your own categories for notes or appointments.

Thus you can list work and leisure appointments separately, or simply keep notes of outstanding calls or jobs in hand. All the normal editing and search facilities work on these user-defined categories as well as the pre-defined ones.

All in all, the *LBO* is, in my opinion, a brave



attempt at creating a computer diary, and it is one of the best programs of its type I've come across so far.

Intersoft, which wrote the program for Gemini, has pleaded lack of space in the 8k EPROM in answer to very few little niggles, and it would be nice to see an interrupt-driven version, like *Sidekick* on the IBM PC.

For the asking price of £19.95, though, this particular program must represent very good value for money.

Life and Business Organiser, £19.95 (ROM or disc), Gemini Marketing, Gemini House, Dinan Way, Exmouth EX8 4RS

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The latest release from Chalice software, over 60 commands on a 16K ROM. The range of commands available means that there is something for every BBC user. For the disc user the ROM provides a skewed formatter to speed up disc access, a disc sector editor, disc search, verify and repair utilities, a useful free space command, plus many other handy commands. For the BASIC programmer, commands include search and replace on a global or selective basis, list active variable values, append BASIC program, move and copy lines, bad program repair, a highly effective routine to shrink BASIC programs down to a far smaller size etc. Other commands include disassembly, memory edit, graphics compilation, comprehensive file transfer utility, function key lister, envelope lister, rom lister, rom save, full rom status, switches roms off through <CTRL><BREAK>, send commands straight to a ROM, KEEP command, inverse video command, a command to send codes direct to your printer, memory search, base conversion, display character definitions, close open files and many others. All commands have been chosen on the basis that they are useful and not as space fillers.

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the SCYTHE

The Scythe toolkit contains a version of the VECTOR 1 tape to disc system, which will transfer most protected tapes, but we have not stopped there. The Scythe has been packed with a host of other commands: MDIS, SDIS, MEDIT, KLIST, BASE, ROMLIST, ROMSAVE, NROM, FLUSH, FORMAT, VERIFY, FREE, SFIND, BFIND XLIST, BAD, MRELOC, SLOW, TDISK, VECTOR, ROFF, RON, SECTLOAD, SECTSAVE, MSHIFT & MSWAP. These commands cover everthing from ROM management, utilities for the disc user, aid for the machine code or BASIC programmer, and a set of general utilities of use to all BBC users. The commands will accept input in HEX, DECIMAL, BINARY and the resident INTEGER variables making the Scythe very easy to use. The Scythe comes complete with a comprehensive manual and a free utilities disk.

NEW LOW PRICE £21.95

ROM MASTER

ROM Master is a budget utility ROM designed for people with several ROMs on their BBC computer. ROM master has several utilities to help prevent the interference which can occur between different ROMs, any ROMs that cause problems can be switched off even through <CTRL> <BREAK>. Using ROM master has been designed to be as easy as possible. Most commands will accept lists, so you can, for example, switch off several ROMs with just one command. ROMs can be specified by their socket numbers or their title or even abbreviations of the title. 20 commands are available, please send for full details.

As a bonus feature for anyone who has files they want to keep from prying eyes, ROM master contains the commands SCRAMBLE & UNSCRAMBLE which will encrypt or de-encrypt a file based on an entered password. The encryption used is highly sophisticated so unless you know the correct password the files cannot be read.

PRICE £14.95

Orders to:
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3 Merlin Way,
Covingham,
Swindon SN3 5AN.

Access

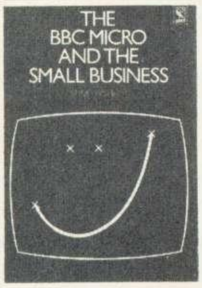
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REVIEWS

BOOKS

SMALL CAN BE BEAUTIFUL



'The BBC Micro and the Small Business', Simon Williams, BBC, £5.75.

Those wanting to know what the BBC micro can do for business will do well to read this book as a convenient introduction. It brings together the basic knowledge – in a very readable way.

It suffers, though, from the serious disadvantage of being a snapshot taken at a specific time – to be exact it can be dated after the release of *Wordwise Plus* and before the arrival of the B+, so about June 1985.

The first chapter describes business applications generally and makes useful reference to second processors. The remainder of the book deals with the software available, with chapters on the wordprocessor, database, spreadsheet and accounts. They are written to be understood by anyone with an elementary knowledge of the BBC micro and there is a useful glossary and index at the end.

To take the chapter on wordprocessors as an example, it describes what they are and how they work before giving greater detail about *Wordwise Plus, View, MemoPlan* and *Perfect Writer/Perfect Speller*. Direct comparisons are made and the menu screen, edit mode and a sample print of the same document are shown for each.

Finally there is a summary of the features of the systems, and their limitations. My only reservation, and it is a small one, is that even though I have used three of them myself, I would be unable to decide which is best for me on the evidence provided.

I'm not sure I like the chapter on accounting systems because, although the introduction is adequate, it only deals with the Gemini Integrated Suite. This is a good package but is not unique, and no reference is made to the many competitors. That gives a clue to the problem of a book about any rapidly changing situation – you have to read all the subsequently published reviews.

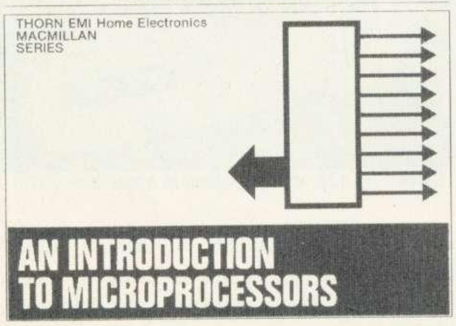
The chapter on program generators and alternative languages is daunting, and I wonder how many prospective business users will be put off by reading it; on the other hand, when it comes to offering advice on the introduction of the software to a business, there is plenty of good sense.

Overall, this is a useful introduction to business uses on the BBC micro and, with the support of the BBC, it is sure to sell well while it remains reasonably current.

Also, at £5.75 it is extremely well-priced for a book of this kind.

Roger Carus

DETERMINED EXCELLENCE



'An Introduction to Microprocessors', Thorn EMI Home Electronics Series, Macmillan Education 1985, £5.95

This book is part of a series and cannot therefore be considered in total isolation. Given the coverage suggested by the other titles listed inside, and on the assumption that they cover their ground as well as this volume does, I would say that the series as a whole would be very hard to beat.

This volume assumes nodding familiarity with the fundamentals of electronics, implied by the required ability to read basic circuit diagrams and graphs, which I suppose would be gained from reading the previous titles.

In a mere 40 pages it succeeds in clearly introducing the concepts of logic functions, Central Processing Unit (CPU) instruction words and architecture, and introducing the 6502 CPU, which, it rightly states, is 'broadly typical of current 8-bit microprocessors'.

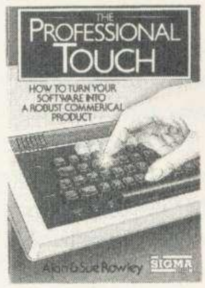
The second half of the book covers a range of theoretical applications including analogue to digital interfaces and data transfer, and the book concludes with a brief but lucid glossary and a basic resumé of Boolean algebra.

This is an excellent book for the determined enthusiast or hobbyist or for schools – I will certainly be keeping it by me as a quick reference guide.

My only beef, though, is the 'landscape' A4 format, which is definitely oversize for the rather soft and insubstantial binding.

Mike Barwise

COLLECTION OF HELP



'The Professional Touch', Alan and Sue Rowley, Sigma Press, £7.95

The alternative title of 'How to Turn Your Software into a Robust Commercial Product' gives more of a clue to the contents of this useful little paperback, which has 169 pages of sensible suggestions for those who write programs.

The book is a collection of useful tips drawn from magazines and practical experience, put together and classified – and none of the worse for that. As well as text there are some useful Basic techniques which can be inserted in your own writing to produce useful and commonly used procedures.

In the early chapters the emphasis is on such basics as producing a good professional menu or a command driven program which could be used anywhere: this leads naturally to building in protection of data techniques to avoid corrupting programs. After trying a few sample listings I was convinced that they had been well tested.

More technical and original ideas are in an excellent chapter on business and finance which covers the use of significant figures in accounting programs, password routines, the validation of dates and certain other data, each with a convenient listing.

None of this is original but most of us have had the experience of searching through old programs trying to find a suitable section which can be adapted.

The chapter on filing systems deals with the problems of compatibility between ROM, tape and disc systems, and offers some guidance on the differences between versions.

On compatibility generally, the chapter on different operating systems brings together a collection of information that up until now I have kept in a loose bundle of photocopied tips collected over the years.

It's useful to have this collection of tips and procedures to draw on without having too many copyright worries, and although it does not offer much to the professionals, it could certainly help people like me to (perhaps) make some money out of our software.

Roger Carus

HARDWARE

PICTURES IN PRINT

The Integrex Colour-Jet 132 printer is an excellent buy, especially for graphics, says Ron Fox

After seeing the advertisements and reviews of colour printers in *Acorn User* and other magazines I decided to buy the Colour-Jet 132 printer. I had not seen any performance tests on this printer in any of the popular magazines written specifically for the BBC micro but had seen one in use beforehand.

Physically the outward appearance of the printer is exactly the same as the Canon PJ1080A reviewed in the July 1984 issue of *AU* and uses the same ink-jet system (the ink cartridges are manufactured by Canon), the pigmentation of the inks making the blue colour appear purple.

The printer needs two cartridges – one with black ink for £6.90 each and a tri-colour cartridge containing cyan, magenta and yellow costing £11.60. According to the manual each cartridge lasts for approximately four million characters or eight rolls of paper. I have been using the printer for eight months (filling two rolls of paper) and the cartridges are still going strong. Replacement of the cartridges is easy: a section from the front of the printer is removed and the cartridge pulled out/pushed in. The cartridges can be bought from Integrex or ordered from them by your dealer.

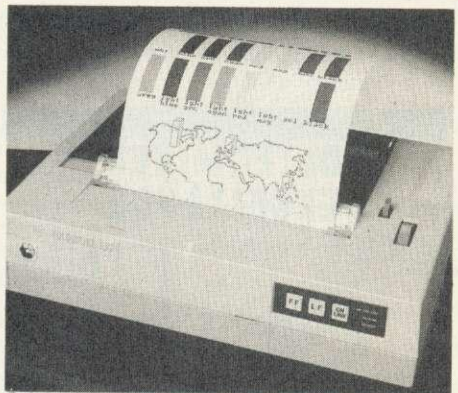
The standard *AU* printer benchmark test (see the September '85 issue) was carried out and gave 29 characters per second (cps) in 'single strike' mode and 16.6cps in 'double strike' mode. The claimed speed is 40cps in single strike mode.

The change from single to double strike mode can be made using Escape controls in the software or simply by pressing the Form Feed button either before or during printing.

The print style is acceptable (at least it has descenders) and print styles can range from condensed characters to double-double sized ones. Italic printing is also possible although it looks rather ugly.

The printer can be changed, either by software or by easily accessible dip switches, to print in eight different international character sets to give characters which are peculiar to most European countries. When first supplied the printer was in the 'American set', ie, it would print out the hash sign but not the pound sign.

For printing light colours such as yellow on a white background, the 'enhanced colour' mode can be set by the software to give a contrasting coloured background. The foreground and background colours can be set in software at any point in the program.



Colour-Jet 132: virtually silent in operation

While not exactly Epson-compatible (see table 2) the printer performs well, especially with *Wordwise* – it will underline, and with judicious use of embedded Escape codes can print fractions. Where the printer is really excellent is when it is printing graphic screens. It will print screens in all graphic modes including mode 7 although this needs a separate screen dump to be added to the end of your program. This is supplied as an extra on disc along with a machine code dump, plus not-too-helpful demonstration programs, for £10. The machine code program can be placed in memory at any location simply by giving the location when *LOADing the program. If none is given, it will load at the default location of &A10.

With the machine code dump the screens are faithfully reproduced (except for blue). Most dot matrix printers I have come across tend to invert the colours on a graphics screen so that what appears white or coloured on the screen is printed black on the paper. The Colour-Jet prints exactly what is on the screen and unless one is wide awake a lot of black ink can be wasted if the background is not changed to white. With a white background and no

Command	Compatibility	Remarks
*SDUMP	N	
*WDUMP	N	
*CDUMP	N	
*ZDUMP	N	
*TDUMP	P	The text was dumped as shown in the text window but started at the left margin instead of in the middle of the page
*JDUMP	N	
*WINDOW	P	Works until one of the other facilities is required
*TRANSTT	P	Does not copy text which is on a coloured background
*RTT	Y	
*LPRINT	Y	
*LPOFF	Y	
*C@	N	CTRL-@ command will work with a modified program given in the manual
*SET	N	
*RESET	N	
*MAR	N	
*SHIFT	Y	
*CP80	N	
*IBM	N	
*Epson	N	
*BDUMP	P	Appended a PROCdump onto end of a program for use on a computer without *UserDump*. A number of these procedures could be appended, for different modes, to the same program!

N = not compatible *Y = compatible* *P = partially compatible – see remarks*

Table 1. Compatibility of *Acorn User*'s *UserDump* ROM and Colour-Jet 132 printer

foreground colour then only a line feed is performed. Depending upon the value used to call the dump the printed screen can either be small (approximately half way across the paper) or large (across the whole sheet of paper).

With a large dump in single strike mode the printer takes 13 minutes to dump a screen similar to figure 3 on page 179 of February 1985's *AU*. If you can wait that long then the images are truly tremendous.

Unfortunately, because the buffer in the printer is only the equivalent of one line of text or graphics image, an external printer buffer is a must as it reduces the waiting time slightly.

The Colour-Jet 132 supports a bit-image data mode giving 640 bytes per line. The colour of the dots can be set to any one of the seven foreground colours available but colours cannot be mixed in this mode. For example, if the bit-image data is set to red foreground colour, all the data will be printed in red foreground colour.

Colour graphic image modes are also supported; one mode giving 640 bytes per line, the other 1280 bytes per line.

In the latter case the printed colours tend to blend into each other and produce an overall darker (greyer) image. Up to 36 colours are supposed to be programmable but I have not been able to sort these out yet. This is perhaps the most disappointing part of the package and is mainly due to the lack of information in the manual. The manual appears to do what most



Mode 4 graphics screen dump

printer manuals do; that is, it assumes that the user is fully conversant with printers and how they work.

There is a comprehensive run-down of what the printer will do and it explains the Escape codes in detail, but there are no example programs to show how the codes work. The printer will only accept specially prepared rolls of paper or A4 cut sheets through a friction feed mechanism. Even overhead transparency film can be printed providing a specially prepared film is bought from Integrex at £64 per 100!

The paper needs to be specially prepared otherwise the printing, on ordinary paper, comes out very pale and even in double strike mode the printing is not as good as single strike mode on the special paper. Coated paper is absolutely useless because the ink does not penetrate the surface and tends to smudge. Fanfold paper with its sprocket holes is too wide and the quality of print is not very good as the ink appears to soak right through this much thinner and coarser paper.

The paper roll is situated towards the back but under a hinged cover and it is extremely easy to change rolls and feed in the paper: with single sheets it's just like feeding into a typewriter. There is a lever on top to apply/remove pressure to/from the feed roller.

Apart from its excellent graphic work the best (and an important) attribute of the printer is its quietness – it is virtually silent as there are no hammers to hit the paper during printing.

The price of the printer may have something to do with the lack of reviews. At £569 it may seem rather expensive, but if you can persuade your bank manager to lend you the money it is an excellent buy, especially for printing graphic work. However, its speed of execution and lack of buffer space rules it out for text work.

Code	Description
10	Line feed
12	Form feed
13	Carriage return
14	Enlarged print for one line
17	Enables printer
19	Disables printer
24	Deletes data in buffer
27,14	Sets double width printing
27,20	Cancels double width
27,45,n	Toggles on/off underlining
27,48	Sets line spacing to 1/8″
27,50	Sets line spacing to 1/6″
27,51,n	Sets line spacing to n/252″
27,75	Normal density bit-image mode
27,82,n	Sets international character set

Table 2. Epson-compatible control codes

Colour-Jet 132 £569 + VAT, carriage £11 + VAT Integrex Ltd, Church Gresley, Burton-on-Trent DE11 9PT. Tel: (0283) 215432.

For Ron Fox's listing to show text and graphics capabilities, see the yellow pages index on page 121



A topical screen produced with Acorn's Graphics Extension ROM

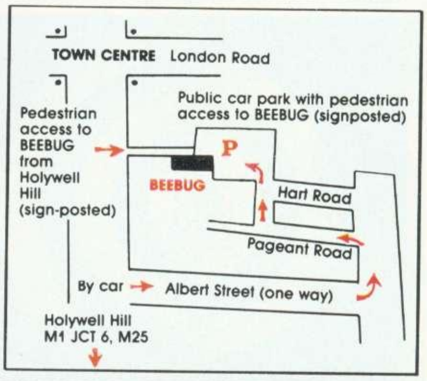
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COMPUTERS

Special Offers

The 16 and 32 bit add-on processors for the Master 128 will be available shortly and so the prices shown below are provisional. Basic II is now available from stock and costs only £20. The Disc Starter Pack consisting of Cumana CSX100, 1770 DFS and 10 Beebug discs, is still proving popular at only £170.

Code	Description	Price Inc VAT
0200G	Master 128 Computer	489.00
0202G	Master ET	389.00
0230C	65C102 Co-Proc 6502 "Turbo"	125.00
0231D	80186 Co-Processor (when available)	399.00
0232D	32016 Co-Processor (when available)	899.00
0234B	M128 Econet Module	48.00
0235B	M128 Eprom Cartridge	14.00
0240C	M128 Reference Manual 1 ADJ22	14.00
0241C	M128 Reference Manual 2 ADJ23	14.00
0242C	M128 Adv Reference Manual ADJ24	19.00
0203G	'6502' 2nd Processor	189.00
0204G	'Z80' 2nd Processor	368.00
0205G	Acorn Prestel Adaptor	135.00
0206G	Acorn Teletext Adaptor	145.00
0207A	Basic II Rom	20.00
0208A	1.2 Operating System Rom	5.35
0209A	1.2 DNFS Rom	20.00
0210B	A to B Upgrade Kit	69.00
0212B	Acorn Speech Upgrade	50.00
0217B	1770 Disc Interface Kit	49.00
0218B	ADFS Upgrade for 1770 DFS	29.00
0222G	Disc Starter Pack	170.00
0225B	Econet Upgrade Kit For B	48.00
0226B	64K Upgrade Kit for B Plus 64-128K	39.00
0237G	Acorn IEEE Interface	320.00

PRINTERS

Special Offers

Whilst stocks last we will be offering the popular Taxan KP810 at the unrepeatable price of £255. This fully Epson compatible printer offers Near Letter Quality print and has a built in tractor feed. Highly recommended.

The Brother daisywheel printer is now available in a faster version at £480. The Canon inkjet PJ1080A priced at £520 is still one of the best selling colour printers, while the new Epson Hi80 plotter is gaining popularity.

Code	Description	Price Inc VAT
0300G	Brother HR15XL Parallel Printer	480.00
0301G	Brother HR15XL Serial Printer	480.00
0303G	Canon PJ1080A colour Printer	520.00
0304G	Epson LX 80 Printer	235.00
0313C	LX80 Tractor Feed Unit	23.00
0309G	Ibico LTR1 Letter Quality Printer	132.00
0310G	Juki 6100 Daisywheel Printer	370.00
0311G	Taxan KP 810 NLQ Printer	255.00
0316G	Taxan KP910 15" NLQ Printer	420.00
0318G	Epson Hi 80 Plotter	415.00
0319G	Epson FX85 NLQ Printer	460.00
0320D	FX85 Tractor Feed Unit	30.00
0321D	FX85 Sheet Feeder	130.00
0323E	Taxan 64K Buffer KIF4308	189.00
0340G	Plotmate A4 Plotter	340.00
0341G	Plotmate A4M Plotter	455.00
0342G	Plotmate A3M Plotter	625.00
0355B	System Software Rom Version	40.00
0343D	Intermate Interface for A4	250.00
0344D	Linscan Optical Scanner	165.00
0401A	2M Printer Lead	8.00
0402A	Epson FX/RX/MX80/FX85 Ribbon	4.00
0403A	Epson FX/RX100/FX105 Ribbon	6.00
0416A	Dust Cover KP810/PW1080A	5.45
0418A	Juki 6100 S/S Ribbon	1.55
0419B	"Fontaid" ROM & Disk 40T	30.00
0420B	"Fontaid" ROM & Disk 80T	30.00
0421B	"Fontaid" Extra Disc "A" 40T	15.00
0422B	"Fontaid" Extra Disc "A" 80T	15.00
0452D	Real A4 Paper, 80gm (2000)	24.00
0453D	2-part NCR Listing Paper (1000)	21.00
0407B	3.5"*1 7/16" Labels 1000	5.00
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0409A	Black Cartridge PJ1080A	7.00
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0413A	LX 80 Replacement Ribbon	4.50
0414A	Ibico Ink Roller	4.60
0435B	MX80 Printhead Assembly	41.00
0436B	FX80/85 Printhead Assembly	52.00
0437B	RX80/80FT Printhead Assembly	41.00
0438B	FX100/105 Printhead Assembly	57.00
0439B	LX80 Printhead Assembly	41.00

MONITORS

The Taxan monitors are still the most popular monochrome monitors, although the Zenith range, costing around £90, are the best budget buy. The Microvitec 1451 is the recommended RGB monitor as it easily handles 80 column text and is priced at only £280.

Code	Description	Price Inc VAT
0500G	Taxan KX1201 Green Short Pers.	105.00
0501G	Taxan KX1202 Hi-res Green Monitor	120.00
0502G	Taxan KX1203 Hi-res Amber Monitor	120.00
0556A	Taxan 1201/2/3 Lead BNC	3.90
0503G	Zenith 123 12" Green	85.00
0504G	Zenith 123 12" Amber	90.00
0530G	Microvitec 1431 Med-res Monitor	210.00
0531G	Microvitec 1451 Hi-res Monitor	280.00
0535G	Supervision III RGB	390.00
0555A	Supervision Monitor Lead	7.00
0550A	1.0m Monitor Lead RGB	5.75
0551E	Single Master Plinth	16.10
0552E	Single Plinth for Monitor	12.65
0553F	Double Plinth for Monitor	23.00

DISC DRIVES

The supply of Cumana drives is no longer subject to delay and the CD800S 40/80T switchable drives fulfill most storage requirements. For single drive owners wishing to extend, the Cumana E series will plug into your existing drive and be automatically configured to drives 1 and 3. If you have large storage requirements the Acorn hard discs must be the answer.

Code	Description	Price Inc VAT
0600G	Cumana 100K CSX100 40T	110.00
0610G	Cumana 100K CS100 40T	140.00
0602G	Cumana 400K CSX400 40/80T	150.00
0603G	Cumana 400K CS400 40/80T	170.00
0604G	Cumana 800K CD800S 40/80T	330.00
0611A	Cumana Disk Drive Guide	1.50
0614G	Cumana CS100E 40T	130.00
0615G	Cumana CS400E 40/80T	165.00
0622G	Acorn 10MB Winch + f'server	1250.00
0623G	Acorn 30MB Winch + f'server	1850.00
0650B	Memorex discs S/S D/D 48TPI 5210	15.00
0651B	Memorex Discs D/S D/D 96TPI 5420	25.00
0652A	Memorex Disc Head Cleaning Kit	9.65
0653A	Library Case – 10 discs	2.25
0654C	Disc Storage Box -up to 50 discs	9.00
0657B	10x 48TPI SS DD Discs	12.90
0658B	10x 48TPI DS DD Discs	17.90
0659B	10x 96TPI SS DD Discs	17.90
0660B	10x 96TPI DS DD Discs	18.90
0661D	25x 48TPI SS DD Discs	30.50
0662D	25x 48TPI DS DD Discs	40.90
0663D	25x 96TPI SS DD Discs	40.90
0664D	25x 96TPI DS DD Discs	43.20
0665D	50x 48TPI SS DD Discs	50.90
0666D	50x 48TPI DS DD Discs	74.90

SOFTWARE

The prices of Logo and Pascal have come down. Viewspell is now available at £34. Computer Concept's Speech System includes the new Text to Speech rom at £31. Interword, the long awaited word processor that is part of the Rom-Link series, is also now available at a special introductory price of £47.

Code	Description	Price Inc VAT
1000B	Acornsoft View 2.1	47.00
1022C	Acornsoft View 3.0	72.00
1001B	Acornsoft View Sheet	47.00
1002B	Acornsoft Hi-View	47.00
1013B	View Printer Driver Cassette	9.00
1014B	View Printer Driver Generator Disk	10.00
1019B	Acornsoft Viewstore Rom	47.00
1021A	Acornsoft Viewindex Disc	12.00
1043B	Acornsoft Viewspell Rom/Disc	34.00
1030B	Acornsoft ViewPlot (when available)	25.00
1007C	Acornsoft ISO Pascal	60.00
1008B	Acornsoft Basic Editor	28.00
1015B	Acornsoft Revs Disc	16.00
1024B	Acornsoft Revs Cass	14.00
1029A	Revs 4 Tracks Disc	12.00
1032B	Revs 4 Tracks Tape	9.00
1016B	Acornsoft Aviator Disc	16.00
1044B	Acornsoft Aviator Cassette	14.00
1017B	Acornsoft GXR B	27.00
1018B	Acornsoft GXR B+	27.00
1031B	Acornsoft Termulator Rom	30.00
1033B	Microtext Disc	53.00
1034C	Microtext Plus	240.00
1035B	6502 Development Pack	45.00
1036B	6502 2nd Proc Elite	19.00
1040C	Micros in Business Disc	65.00
1041B	Acornsoft Forth Rom	48.00
1042B	Acornsoft Forth Disc	19.00
1100C	Wordwise Plus	45.00
1102B	Wordwise	28.00
1103B	C.C. Graphics ROM	24.00
1106B	Accelerator	55.00
1107B	Speech ROM	27.00
1115B	Speech System inc TTS	31.00
1108A	Acorn Speech Proc (With 1107/1115)	10.00
1109B	Disc Doctor	27.00
1114B	Interchart	28.90
1117B	Interword	47.00
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1151B	AMX 3D Zicon Disc	20.00
1152B	AMX Database Disc	20.00
1153B	AMX XAM	20.00
1154C	AMX Pagemaker Plus	45.00
1155B	AMX Superart Rom	45.00
1156B	AMX Paint Pot Disc	12.00
1160B	AMX Utilities	12.00
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1171D	Fleet Street Editor 80T	36.00
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1173A	Mini Office II 40T	16.50
1174A	Mini Office II 80T	16.50
1175A	Clares Replica III	15.00

OTHER HARDWARE

The Beebug Magic Modem is a new addition to our hardware list. At £109 it includes software for all conventional baud rates, is fully BT approved and is B, B Plus and Master compatible. The Watford 12 Rom board, at under £37, has all the features of a conventional rom expansion board but has cheap write/read protect switch and battery backup options.

Code	Description	Price Inc VAT
0701B	Aries B32 RAM Card	86.00
0740B	Aries B12 Rom Board	45.00
0749A	Aries B12C Adaptor	5.75
0702B	Watford 32K RAM Card	65.00
0704B	ATPL ROM Board for Model B	39.00
0735A	ATPL Battery Backup kit	17.00
0705A	2764 8K eprom	3.45
0706A	27128 16K eprom	4.60
0707A	6264 8K ram	4.50
0708A	Eprom Extractor Tool	4.00
0709D	Watford Eprom Eraser	32.20
0710B	Softlife Eprom Blower	75.90
0714A	BBkey Function Key Labels	2.00
0715A	Dust Cover for BBC B/B+	2.99
0717A	Watford Sideways ZIF	17.25
0718B	Voltmace Delta 3B Single J'stick	12.00
0719B	Voltmace Delta 3B Twin Joystick	19.00
0720B	Voltmace Delta 14B Joystick	14.00
0721B	Voltmace Delta 14B/1 Interface	14.00
0736A	Watford 12 Rom Board	36.80
0737A	Watford Battery Backup	3.45
0755A	Write Protect for 12 Rom	2.30
0761E	Nightingale/Commstar Combo	135.00
0762C	Beebug Magic Modem	95.00
0763C	Beebug Magic Modem + Software	109.00
0713A	Phone 2 into 1 adaptor	6.30

This months codebreaker number is J27064

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BUSINESS

NEWS

Acorn drops Z80 upgrade

In spite of earlier promises, Acorn has no plans to update the software originally supplied with its Z80 second processor.

Back in October of last year, a spokesman for the company said that the company had 'a policy of continuous improvement.' However, a recent review of the CP/M market seems to have changed Acorn's mind, and the latest comment is that the company 'can't really justify updating software at the moment.'

Master Mouse

Master owners can now reap the benefits of a mouse in the house. Advanced Memory Systems have released Master versions of their popular AMX Mouse and *Pagemaker* packages.

The *Pagemaker* software is virtually identical to the original version for the Beeb except that instead of two ROMs and two discs, the whole lot comes on three discs. The main software comes in the form of ROM images which the user simply boots up into the Master's sideways RAM.

The standard Mouse package uses a similar approach for the AMX Super ROM and *Super Art* software. But in the case of *Super Art*, AMS has taken the opportunity to make several improvements. Several of the windows have been made larger and there is an option to remove the last drawing operation.

The package costs £89.95, but there is an upgrade option for existing Mouse owners at £14.95.

AMS can be contacted at 166-170 Wilderspool Causeway, Warrington WA4 6QA. Tel: (0925) 413501.

Easy-call auto-dialler

by Steve Mansfield

Wigmore House is launching a computer-controlled telephone dialler at the *Acorn User* show. The Easicall gives your voice the same kind of deluxe treatment that some people give their modems.

Using the database that comes with the package you can quickly find a name and number with nothing more than a few characters and then, with a single press of a button, the Easicall dials the number. A built-in speaker lets you hear what's going on so you can pick up your phone when the person answers.

Installing the device is simply a matter of plugging the Easicall into the Beeb's user port and your telephone socket, and then plugging your existing telephone into the machine.

The database software is supplied on disc. With the standard Beeb it will take up to 150 names, addresses and phone numbers. With the Master you can have more than double this number. The contents of the database may be dumped to a printer.

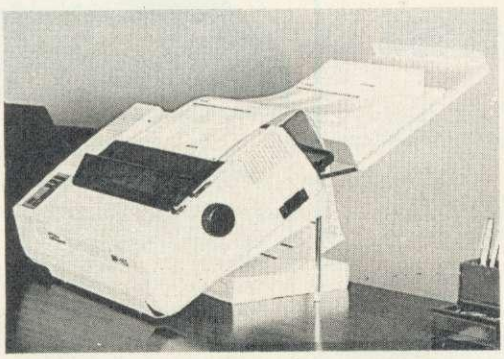
The system can be programmed to stack up to 10 calls which the Easicall cycles through until they are all answered.

Other features include password protection for long-distance calls – which might be useful within a company – and last number re-dial.

The Easicall also has a special interface for which the company is developing a range of add-on devices. One of these will be a proximity sensor. In conjunction with a preset number and a tape loop, this could be set up to phone your friends and tell them you've got burglars while you're away on holiday.

The crucial BABT approval is being applied for, and the company sees no problems in getting it, particularly as the Easicall is to be manufactured by the well-established telecoms company Ansafone and costs £89.90.

Details are available from Wigmore, 32 Saville Row, London W1X 1AG. Tel: 01-734 0171.



Stand by your printer

An unusual printer stand has just been launched by PW Engineering. The stand holds the printer at an angle, making the paper easier to read, and a tray is provided to catch the printed sheets. Blank paper can be stored underneath the stand.

Prices are around £35 for the standard size and £45 for large printers.

Further details are available from PW Engineering, Churchill Road, Bicester, Oxon. Tel: (0869) 253226.

Double helping for Wordwise Plus users

Two new products should help users of *Wordwise Plus* get the most from their wordprocessor.

Wordpro is a new software package from Softec which enables you to edit long documents.

As well as continuous processing of files the package offers extra editing commands and facilities, including multiple printing, previewing and printing of single pages, automatic file backup, text highlighting and function key utilities. The software is available on 40 or 80 track disc at £23 inclusive. Details from Softec, 25 Holmfield Avenue, Bournemouth, Dorset BH7 6SF.

Meanwhile, Norwich Computer Services has launched *The Complete Wordwise Plus Handbook*, which runs to no less than 420 pages, and should contain everything you ever wanted to know about the software, including over 60 programs. It has been officially adopted by Computer Concepts as the definitive user guide.

The book costs £17.50 including postage. Most of the programs are also available, on 40 or 80 track disc, for £7.50.

Contact Norwich Computer Services, Freepost, 31 Cattle Market Street, Norwich NR1 3BR. Tel: (0603) 621157.

Confusion about data protection

Confusion still surrounds the Data Protection Act. One month after the deadline around 133,000 have registered their use of computerised data banks.

This is still well below the expected number. Many more who should register are not doing so because they wrongly believe themselves to be exempt. And even many of those who have registered are having problems.

But by far the biggest problem is the complexity of the Act itself. For example, some people seem to think they are exempt if they write to everyone on their lists asking for their consent.

In fact this applies only to simple mailing lists, which are in no way connected to sales records, orders and so on. Although there are exemptions, they are very restricted.

Enforcing the act will not be easy. The Deputy Registrar, Mr Aldhouse, told us: 'It will largely work by people approaching it with good will.'

Unfortunately, given the confusion over this particular Act, good will might not be enough. The registrar will soon be conducting research to find the main problem areas and could even recommend changes to the act. *Acorn User* would like to hear of any problems that readers have had with the Act.

Chinese translator pack from Primrose

by Steve Mansfield

They're going crackers in China . . . they're going potty in Peking . . . why?

A software package was shown at a recent exhibition in Peking, which offers help to the Chinese, not only in writing their own language, but also in others.

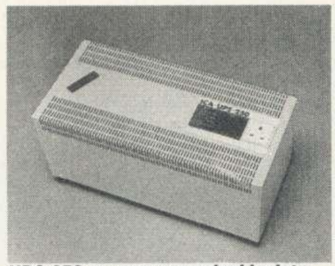
The package is *Tick-Tack*, produced by Primrose Publishing. It uses a building-block approach to translating business phrases, allowing people to produce correspondence in a foreign tongue.

The system is available in several forms – as books, audio cassettes and software to run on a range of business micros, including the Beeb. A text editing package, known as *Tick-Tack Writer*, is available to work in conjunction with the translation software.

The exhibition was China Didacta 86, which was aimed at the training and education markets. At the same time *Tick-Tack* packages, which cover a wide range of languages, were being exhibited at shows in the USSR and Poland.

The software aims to help the Chinese with their own language through the text editing facilities: it contains over 14,000 Chinese characters on disc.

According to Primrose's David Sephton, *Tick-Tack* so impressed the UK Foreign Office that they produced a mailshot on behalf of the company. Contact Primrose Publishing, 11 Church Street, Thriplow, Cambridge SG8 7RE. Tel: (0763) 82512.



UPS 250: saves your valuable data

Keeping your micro safer

A new device from Eaton Limited makes sure your micro keeps going even if there's a complete power failure.

The UPS 250 battery-operated power supply not only filters out any disturbances or spikes in the mains supply, it also provides full mains-type power for at least 20 minutes, should the mains fail. It costs £650.

Further details are available from Eaton Ltd, Eaton House, Molly Millar's Lane, Wokingham, Berks RG11 2QS. Tel: (0734) 794717.

Electronic mail service makes its debut

A new electronic mail service has quietly arrived on the scene. The system, known as GeoNet, has been running for several years on the continent and is now available in the UK.

It originated in Germany, but there are now host computers in several European countries. Indeed in some of them, including Germany, it is the largest electronic mail system. Most of its present 10,000 or so subscribers come from the continent and the USA. One of the system's strongest features is that it is multi-lingual, and can be accessed in any of the European languages.

The service is hooked up to the PSS network, and so can be reached at local call rates from most parts of the country. It is also connected to around 50 of the better-known on-line databases. These include news services (such as UPI and Associated Press), as well as business, law and travel databases.

GeoNet also contains special interest areas, and it's possible for like-minded people to set up their own bulletin boards. The service is compatible with all common terminal types including viewdata.

The service costs £10 per month, plus 8p per minute. On top of that, there are third party charges for the databases, some of which can be very expensive. In many cases, however, GeoNet has negotiated special low rates.

For details, contact GeoNet at 17 Mackeson Road, London NW3 2LU. Tel: 01-267 0188.

BUSINESS TOP FIVE

	Title	Publisher	Cassette	Disc	ROM	Electron	B+	6502	Econet
1	Mini Office 2	Database	£14.95	*	—	—	Yes	Yes	No
2	Mini Office	Database	£5.95	*	—	Yes	*	*	No
3	Database	Gemini	£19.95	£23.95	—	No	*	No	No
4	Wordwise Plus	Computer Concepts	—	—	£56.35	—	—	Yes	Yes
5	View 3	Acornsoft	—	—	£89.70	No	*	Yes	Yes

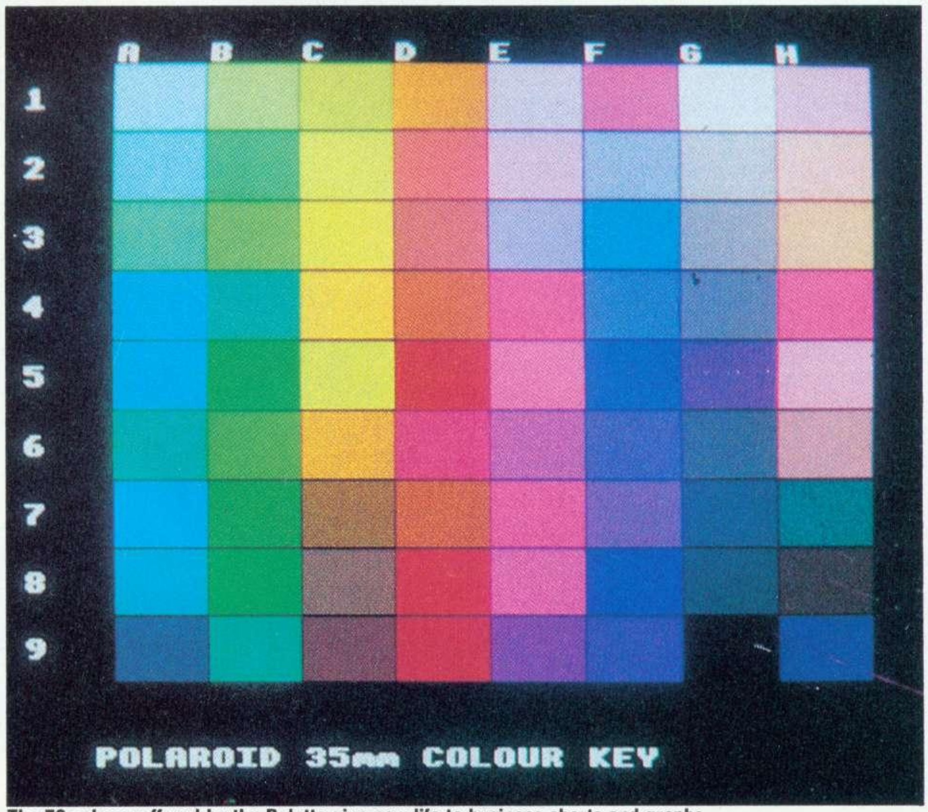
Compiled by Gallup/MicroScope. *Contact publishers: Database Publications, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY. Gemini, Gemini House, Dinan Way, Exmouth EX8 4RS. Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX. Tel: (0442) 63933. Acornsoft, 645 Newmarket Road, Cambridge CB5 8PD. Tel: (0223) 214411.

BUSINESS

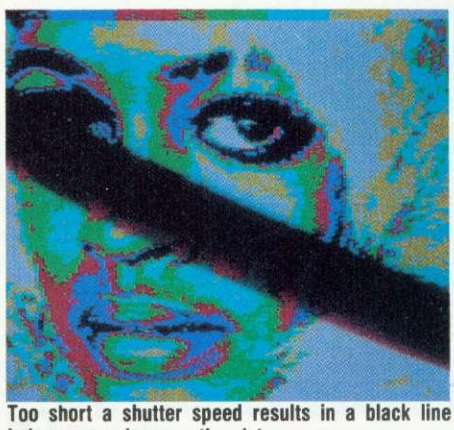
PRETTY AS A PICTURE

We offer advice on how to make the best of your screen shots and look at how the Polaroid Palette can help you

Robin Mudge



The 72 colours offered by the Palette give new life to business charts and graphs


Too short a shutter speed results in a black line being exposed across the picture


AMX Art work by Anita Lear. This picture was exposed by the Palette

Computer graphics is one of the most interesting applications of the micro and until recently the most elusive. Every day on the television you see the results of computerised special effects generators and electronic paint boxes. There is even a computer animation film festival and, as anybody who saw the last round of entries will tell you, the results are staggering. But at several million pounds for professional computer graphic equipment it's rare that you come across a system chugging away in an amateur's back room!

At least there are a number of worthwhile computer graphics packages for the BBC micro and similar computers. The best known are the AMX Mouse and its associated software which turns the micro into a very good computer paintbox, and the more serious Computer Aided Design (CAD) software such as the Bitstik II package from Robocom.

These packages offer many things to many people. They are fun to use and also give the budding computer artist an ideal opportunity to experiment at a realistic cost before attempting to use more expensive systems. But whatever your use and whether it be on a full-blown multi-million pound outfit or a BBC micro-based system there is one problem which bugs everybody – how to get the pictures off the bulky VDU and onto photographic film.

It's not difficult getting pictures on to paper. Most packages running on the BBC micro will allow a screen dump to be made on a dot matrix printer, in colour or black and white, and some even drive good quality flat-bed plotters. Often, though, a paper copy isn't sufficient: imagine producing a set of graphs and charts for a business meeting – it would be useful to have these as 35mm slides so they can be projected on to a screen. There are a few graphics packages specifically designed to help produce these business graphics.

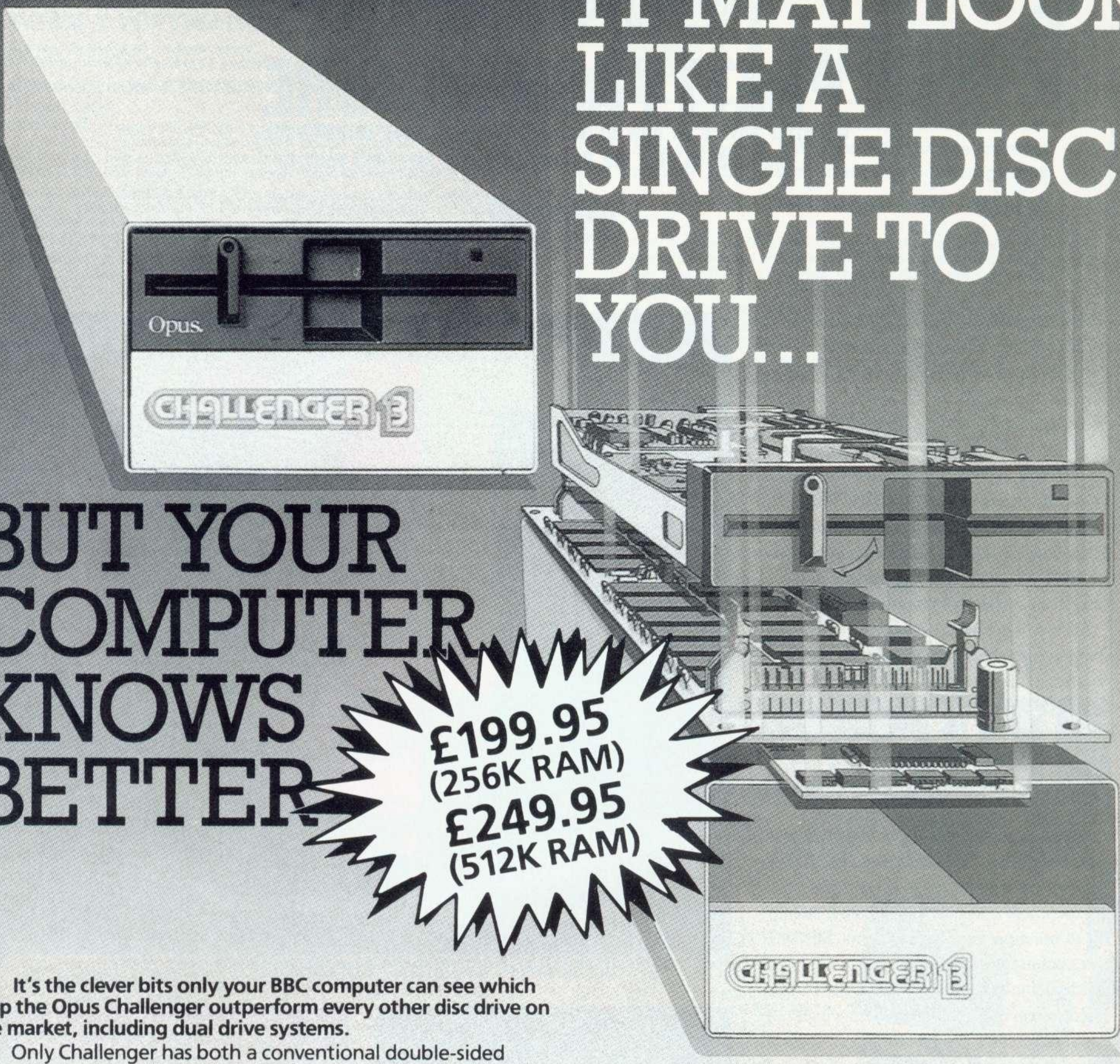
There are two main methods open to the amateur and professional; the first and cheapest is to point a 35mm camera at the television or VDU and click, take a snap shot. With a little bit of thought taking photos of the screen can produce good results; here's how to go about it.

First, get hold of the best monitor or television you can, the best being a high resolution RGB monitor. The resolution of the picture can't be altered (that's a function of the computer), but the quality of the displayed picture is affected dramatically. An RGB (red, green, blue) monitor takes the electrical signals which make the picture directly, without scrambling them into signals that an ordinary TV can accept, and this gives a clearer picture. Also, on a high resolution monitor the red, green and blue images are more accurately aligned on top of each other, so reducing colour fringing around the edges of images, which is a common fault in less expensive, low resolution models.

The little dots of phosphor which glow to make up the picture are also much smaller, again giving better quality. Set the monitor to produce a well-saturated, medium bright picture. Don't turn the brightness up too far because this produces a blurred picture.

Next, in a very dark room, take a single lens

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Opus.

reflex 35mm camera (larger formats can be used in the same way), preferably with a through-the-lens meter system (do not use an ordinary light meter close to the screen because the magnet inside can magnetise the front of the monitor and then produce colour distortions). Put the camera on a sturdy tripod and point it at the screen.

The screens of most monitors and televisions are slightly curved (this is to give them strength), and this distorts the picture at the edges unless it is viewed absolutely square on – setting the camera to look square on is the most time-consuming and tricky bit of the whole operation. It helps to use a longer focal length lens on the camera – a 90mm or 150mm lens is ideal – and you may need to use extension tubes on your camera to get the screen in focus.

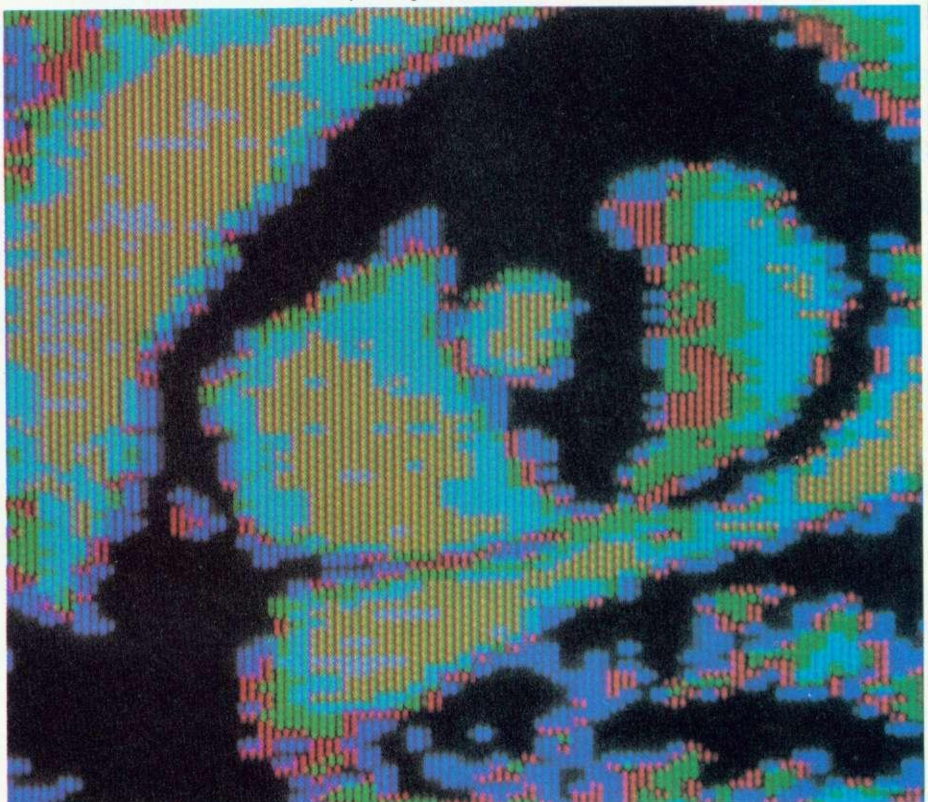
Now the film itself. Most modern daylight balanced colour slide films will produce good quality slides, though all of them suffer from a few limitations which will be discussed later. Don't choose a very sensitive film; a speed of between ISO 25 and 200 is best (ISO is modern language for the old-fashioned ASA). There are a few specialist films from various manufacturers' technical ranges which are worth trying, the most notable being Kodak Photomicrography film type 2483. This is a high contrast film which produces well-saturated results. It is less sensitive than most at only about ISO 16 but its principal disadvantage is its lack of availability: you will have to order it specially from your local photo shop.

Exposing the film is easy when you know how. The lens aperture is not critical – it's best to set it at about f8 as this is the aperture that most modern lenses are designed to produce their sharpest pictures at (the optimum aperture for modern lenses is often engraved in red on the aperture ring). The shutter speed is the all important thing, and it will help if I explain how a television picture is produced.

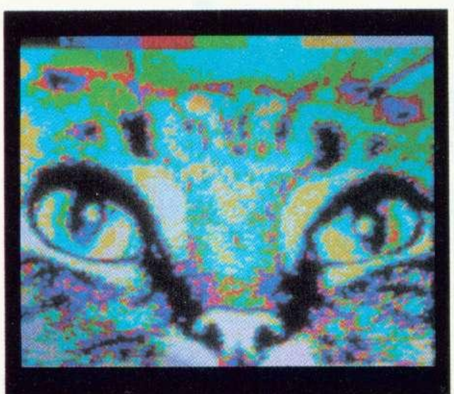
If you could slow time down when looking at the monitor you would see a moving spot of light getting darker and brighter as it travels from the top left of the screen and moves in a straight line to the right. It momentarily disappears only to reappear a little lower down on the left again.

This process goes on until the spot gets to the bottom right when the whole process starts again. Usually this happens so quickly that the eye blurs it all into one (a phenomenon called persistence of vision) and the whole screen looks as if it's covered with a series (or raster) of lines. The darkening and lightening of the spot produces the tones of the picture.

In the British TV system there are 625 lines in the picture and 25 pictures are shown every second to create the illusion of movement: in other words, one picture is shown every 1/25th of a second. This is important when selecting a shutter speed but before discussing why, some more information is needed. Twenty-five pictures a second is more than adequate for creating movement but not good enough to make the persistence of vision work properly – the moving picture would look intolerably flickery. A speed of over 40 pictures a second is needed and to achieve this a clever bit of skullduggery is used. Each picture is shown twice in 1/25th of a second, each showing lasting 1/50th of a second. What happens is that in the first 1/50th of a second the TV shows every even line of the picture (a total of 312.5), and in the next all the odd lines are shown, another 312.5, so making a total of 625 lines in 1/25th of a second. Each half picture of 312.5 lines is called a 'field', the whole picture is a 'frame', so the two fields are 'interlaced' to make every frame. Back to the camera.



A close-up of a conventionally photographed, low resolution cat . . .



. . . and the full feline face, this time from a high resolution monitor . . .



. . . and finally the cat exposed by the Palette, showing greater colour saturation

You can see that the shortest shutter speed should be 1/25th of a second so both fields can be recorded on film. Any shorter than that and a black line will be exposed across the picture because only part of one of the fields will have been picked up. However, it is unwise to use 1/25th of a second because of possible timing errors in the computer/monitor and the camera – it's better to go for the 1/2 to 1 second. This gathers a number of frames and ensures an

even exposure of the picture all over the slide. Any longer than a second brings in a film gremlin, 'reciprocity failure', which is regressive and can not only turn a four second exposure into a four minute one but can also throw the colour balance of the film wildly out, producing weird colours.



The Polaroid Palette: allows computer-generated graphics to be turned into full colour 35mm slides

Assessing the shutter speed is easy with a through-the-lens metering camera. Set the computer to produce a white screen and read the exposure, which in photographic terms is 'peek white'. The exposure then needs to be reduced by two f stops to get the correct setting. If the meter says use a shutter speed of 1/25th of a second, two stops less is 1/2 a second (halving or doubling the shutter speed increases and decreases the exposure by one f stop respectively and decreasing and increasing the f stop by one number does the same).

Here are a couple of tips: turn off the interlace in the computer by using *TV0,1 before any mode changes. The computer cheats to produce the two fields, making a flickery picture, so turning it off produces a steady picture and thus sharper slides.

Also, use VDU 23;8202;0;0;0; to turn off the cursor. Finally, hide the prompt with a piece of black tape. You are now ready to press the shutter release.

There are a few drawbacks, though, to photographing a monitor screen: you can see the dot structure and the lines of the screen (see the front cover, Sept '85); it is a time-consuming job and has to be done in a darkened room; and the colours can be disappointing. The last is because of a mismatch between the phosphors making the colours on the screen and the colours to which film is sensitive. Remember, colour film is basically three black and white films stuck together, each of the three being sensitive to red, green or blue light of a particular wavelength. The red, green and blue phosphors of the monitor give out light at slightly different wavelengths, resulting often in poor reds and blues.

All these disadvantages can be overcome by using a new product from the Polaroid Corporation, the Polaroid Palette. The Palette is a low-cost RGB camera and works in a similar way to all RGB cameras, many of which cost £20,000. It is a must for people who need to produce slides regularly.

The principle is simple. Enclosed in a light-tight box which sits on a shelf is a precision flat-faced TV tube that produces a distortion-free black and white picture. Facing it is a still camera. Between the camera and TV tube is a wheel driven by a stepper motor which contains a red, green and blue filter. The following sequence produces a picture: first, the electronics selects the red video signal from the RGB output of the computer. The red filter is then rotated in front of the camera lens and the camera shutter opened. Then a picture is displayed on the tube for a set number of frames after which the tube is turned off. The green filter is interposed between the camera and tube and the green picture exposed. Finally the blue picture is exposed and the camera shutter is closed.

In this way three black and white separation exposures are made on to a single frame of colour film, the whole process taking about two minutes. The exposure of each colour is carefully controlled so that the colour film will produce exactly the right colours.

The Palette comes as a complete kit at £850 plus VAT, available by direct mail from Polaroid UK. It is a small cream box measuring 20cm by 14cm by 32cm. Onto the front can be secured a 35mm camera or a 3.25 × 4.25in instant picture unit. The kit comes with all leads, a 35mm instant film processor, a slide mounter and software for the BBC, Apple 11e, IBM or DEC micros. It differs in operation from the expensive cameras by being controlled by the host micro: the software gives instructions to the Palette through the RS423 interface. Only one video supply is needed, coming from the Video socket on the back of the computer. Instead of physically switching the RGB component signals, the software isolates them on the screen and carries out the filter and exposure control in the camera. The software is menu-driven and offers the user a choice of a number of film types. Setting the system up is a once-only affair and the set-up facilities are good, allowing the system to be adjusted and lined up in a couple of minutes.

The software works out the proportions of red, green and blue contained within each colour in the picture. The software then performs a set of time exposures through each filter, turning appropriate bits off during the exposure of each colour, depending on how much of that colour the picture contains. This is where the software gets really clever, bearing in mind that the colour an object appears on film depends on the proportion of red, green and blue that it contains. So changing the red, green and blue exposure for all the green bits in the picture can make them appear, say, pink on film. The Palette offers a choice of 72 colours on film, and any of the 16 BBC micro colours can be chosen to come out in any of those 72 colours – it means a whole new life for the business charts and graphs.

Changing the colour set is simplicity itself, but be warned that experimenting with it uses up many rolls of film!

The Polaroid Palette £850 + VAT
Polaroid UK Ltd, Ashley Road, St Albans, Herts AL1 5PR

EDUCATION

NEWS

System's new music maker

Peter Beater's Music Game, first mentioned in February, is now available from System Software and is aimed at the infant age range. This excellent package is not only technically good, it is also founded on good teaching principles, children find it most stimulating, and parents can modify the difficulty and sound levels.

The children are introduced to simple listening work as the notes move up and down the scale: this movement is also represented visually. Simple tunes may be constructed and then the concept of length of note is introduced. Further development activities are suggested as well as a book list.

Also from System, for the same age range, comes a series of Early Maths programs called *Faces, Nasty Games* and *Grid Games*. The first deals with sets – making faces from their components and sorting them by characteristics. *Nasty Games* urges children to outwit each other by developing problem-solving strategies. *Grid Games* takes all these concepts a stage further and develops an understanding of the inter-relationship of numbers.

Contact System Software, 12 Collegiate Crescent, Sheffield S10 2BA, for more details.

Watch your language

BBC Soft has departed from its traditional scientific/technological themes in order to tackle modern languages.

This area has always been a problem in educational computing as Beeb does not have as standard any continental character set. More important, however, is that the software generated has tended to be of the drill and practice variety – often to a tedious level. The BBC has linked its software to its television modern language tutorial courses and are marketing *Deutsch Direkt* (£22.95) and *A Vous La France!* (£19.95) sets of software.

The software contains most of the ideas which have been used by CALL (Computer Assisted Language Learning) users recently, though it is worth noting that the BBC quality and robustness shows through. The *A Vous La France!* software, for example, tackles vocabulary with anagrams, cloze tests, error correction and multiple choice.



The vast variety of these simple, quick programs is the key to their success. Users are unlikely to tire of a lesson which consists of a rapid five-minute burst of questions or puzzles, particularly if they know there will be something different in the next unit.

Moreover, these themes are developed in good educational tradition by linking them to actual situations 'in the street' in France – asking the way, telling the time, buying food and catching trains. Add to this some basic grammar such as use of pronouns, adjectives and their relative gender and agreement, and you have a most interesting set of software.

The prospective holidaymaker will find this useful for revision, especially when tied into the excellent television series. This package comes on two cassettes which may be transferred on to disc to make six discs-full of exercises!

The *Deutsch Direkt* package is slightly different. It is intended to be a vocabulary builder and to that end it contains a software



dictionary of over 1000 words, two teaching programs, three games and a revision unit which centres around particular vocabulary topics. To back this up there is an audio tape which rehearses you in the pronunciation of the vocabulary. This is simple drill and practice but has been done rather better than some of the attempts around at the moment.

Schools will find these packages useful, because they will provide a useful resource in an area which has little good software.

For further details contact BBC Soft, 35 Marylebone High Street, London W1A 4AA.

EDUCATION TOP FIVE

	Title	Publisher	Cassette	Disc	ROM	Electron	B+	6502	Econet
1	Speech!	Superior	£9.95	£11.95	—	—	—	—	Yes
2	French Mistress	Kosmos	£8.95	£9.95	—	Yes	Yes	*	Yes
3	Biology	Hill MacGibbon	14.95	£19.95	—	Yes	*	—	*
4	Happy Writing	Bourne	£8.95	£10.95	—	Yes	Yes	Yes	Yes
5	Best 4 Language	ASK	£19.95	£19.95	—	Yes	Yes	—	—

Compiled by Gallup/MicroScope. *Contact publishers: Superior Software, Regent House, Skinner Lane, Leeds 7. Tel: (0532) 459453. Kosmos Software, 1 Pilgrim Close, Harlington, Dunstable, Beds. Tel: (05255) 3942. ASK, London House, 68 Upper Richmond Road, London SW15. Tel: 01-874 6046. Hill MacGibbon, 8 Grafton Street, London W1M 3LA. Tel: 01-493 7070. Bourne Educational Software, Bourne House, The Hundred, Romsey, Hants SO5 8BY. Tel: (0794) 523301.

The name game

An interesting thought – if the former MEP Primary Project continues under MESU will its acronym be MESUPP?

Commentary by Nick Evans

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EDUCATION

NEWS

Soft science from Shell

Shell UK has launched a software package of interest to all teachers of science in primary and secondary schools.

Softlab is a software guide to scientific problem-solving. Shell says: 'The software will greatly expand the number and scale of scientific ideas which may be quickly and safely explored by pupils. In addition to the more usual school experiments, it will allow pupils to explore commercial and industrial problems of the type they will meet when they leave school or college.'

Experiments

The experiments are controlled from the keyboard in much the same way as the scientist controls experiments from the safety of the laboratory console. The package is presented in two stages – the first running from five-year-old upwards and the second from 11 upwards. *Softlab* is being promoted initially through two titles – *Measuring and Weighing* for the junior end and *DC Electricity* for the seniors – and others will follow.

The idea of giving teachers and pupils sets of interlinking 'components' on screen to simulate an experiment, an electrical circuit or a pin table is not new.

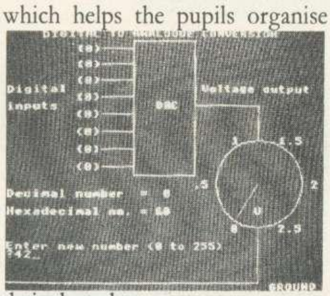
However, this package aims to take this practice to new heights with high quality graphics and a variety of subjects tackled in a detailed way. As Professor Bill Jolly of King's College is quoted as saying: '*Softlab* is not a set of simulated experiments with variable parameters but a collection of realistically simulated components to be assembled at will – more like a box of Meccano than a toy car.'

The materials, available from Hodder and Stoughton, cost £13 for the disc and a colour booklet.

Bright Sparkes idea

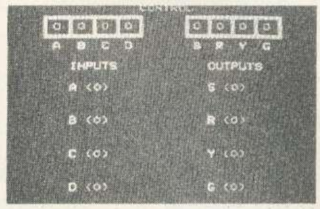
Digital Electronics by Bob Sparkes from the University of Stirling follows similar principles to those adopted by Shell (see left) in their *Softlab* approach.

It provides a series of experiments which allow the intricacies of microelectronics to be demonstrated on-screen in a simple and foolproof way. There's also a guide in the form of a tutor book which helps the pupils organise



their thoughts.

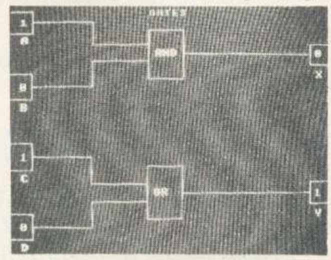
The course consists of three units – Coding Information, Digital Systems and Microprocessor Systems – and they allow the user to place components into circuits



and examine the effect of changing their rating or their nature on the end result.

The course is aimed at secondary student, ITECs and FE colleges and to an extent it gets rid of the need for expensive introductory circuitry kits such as MFA or the Unilab *Alpha* range. However, many would argue that there is no substitute for the real thing, even one step removed from hot-metal soldering. It seems likely that Bob Sparkes' answer would be: 'That's OK if you can afford it.' With MFA currently running at about £100 for a class set and *Digital Electronics* at £49.95 including software and books, there seems to be some reason for competition. (Network packs of *Digital Electronics* are available at £150 with five booklets.) Moreover, as these materials are eligible for the DTI Software Scheme (hardware items are not) this is another good reason for choosing this approach.

It is not possible, though, to get



the same effect with a circuit on screen as with the hard-wired component. If visibility and public shows are what's needed, hardware kits will be required.

Contact Addison-Wesley Publishers, Finchampstead Road, Wokingham, Berks RG11 2NZ. Tel: (0734) 846136.

A reader for the library

Back in April 1985 an item was published in Education News about the Bar Code Reader Project being undertaken by MEP and published through Addison-Wesley. At that time I posed the question '. . . but what can you *do* with it?'

Addison-Wesley has answered the question itself by publishing an extension of the original project under the title *Edlib* – it allows the flexible use of the bar code reader as a library management system.

The user can keep track of withdrawals, returns of books and overdue notices, and uniquely identifies both reader and book title from the bar code. This means that the charging systems used in schools can be converted to a much easier computer-based structure.

Several question emerge, however. How many schools will have a micro available full time in the school library? How many schools will have a librarian who is willing to use it? How long will it take to enter an average secondary school library into the system (15,000 books)? Will it have the capacity?

Answers

The answers are surprising, to say the least. In reverse order, the system has a capacity for 65,000 titles with records relating to title, author, Dewey Number, price and a spare field of four characters. It can handle 2500 students and may be operated either using the Bar Code Reader or the keyboard.

The company has changed from using an infra-red system to one using visible light which gives a more reliable reading on black-white surfaces, especially if they happen to be laminated, as reader tickets might be.

The system generates its own reader tickets and book identifiers including bar codes. The biggest job is to enter the data into the system. This will vary according to the size of the library but will be a task which might usefully be undertaken by interested teams of parents, teachers or children.

The system needs a twin double-sided 80-track drive and Basic 2 as a minimum and is likely to cost about £100.

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ILLUSTRATIONS BY IAN DICKS

GIVING HELP WHERE IT'S NEEDED

It's time that computers were introduced to school administration. We look at the advantages and drawbacks of hi-tech management

Chris Drage and Nick Evans

Visitors from foreign educational establishments who come to this country are amazed by two things: first, the quality and quantity of software available for schools and second, that schools are still administered with quill and manuscript. As with any major business concern, schools in most countries in Europe use computers to control their affairs. This means that they tackle day-to-day accounting, registration, planning and general paperwork via a system usually provided by central government with links back to national or regional computer centres.

The overseas schools are not necessarily too pleased about some aspects of this operation but one thing is certain – the paperstorm which exists in English schools is at a much lower level on the continent. Why have our schools not provided themselves with this type of set-up? The reasons are historical and, for once, are not founded on incompetence but rather on beneficence. The exceptional provision made by national government in the early stages of computer use gave schools an opportunity to integrate new technology into a much greater range of curricular areas than would otherwise have been possible. All available machines were snapped up, not only by computer departments but also by enthusiastic teachers in many other subjects. Schools which reserved a machine for administrative use were frowned upon as denying the children the rightful use of 'their' equipment. With other financial pressures it was unlikely that a school would budget for a separate machine for administration and so the situation was perpetuated.

How can the computer help? Applications have been developed for most administrative tasks in school – the extent to which those applications are helpful or otherwise depends mostly on how much data is shared between linked tasks. For example, a program which produces class lists, house lists and year groups is quite useful: it sorts the pupils according to the needs of the user. If, however, the same use buys a different package for producing option blocking in the third year, another for timetabling and yet another for examination entry, the same basic data – ie, names, forms and year groupings – will need to be entered three or four times, once for each of the different packages. An integrated system



which can draw on one common data file reduces the amount of keyboard work to a large extent. In fact, it is probably true to say that *unless* a school uses an integrated system it is unlikely to gain any significant advantage from its computerisation.

As yet there are few packages which get near the ideal 'integrated' approach and none so far that have achieved it.

The 'near misses', however, have a good deal to commend them. It should be pointed out that one of the reasons companies have not managed to attain the lofty heights of integration is due more to the nature of the BBC machine and its limited memory than to their lack of aspiration.

Having reached a slightly more stable time when schools have been thrown back on their own resources there has been a considerable resurgence in the ways in which computers can ease the path of both the teacher and the administrator. In looking at this subject it is necessary immediately to divide the discussion into two halves: stand-alone systems and national or regional networks.

Stand-alone systems

To answer the question how can the computer help?, it can be used for pupil records, class lists, form lists, house lists, year lists, teaching rooms, staff allocation, full-blown timetabling, Form 7, macros (eg, integration of different names and addresses into a set letter), examination entries, examination results analysis, statistics, parents' evening organisation, staff cover list and stock control, not to mention the wealth of uses when the computer is linked to the outside world by a modem. No one package covers all these applications although there is a useful set of utilities in the national MEP's Computer Domain Pack – *Business Data Processing* – called *Software Tools* which looks as though it could be adapted to cover pretty well any contingency that might appear, all based on common sets of data.

One company which has had a good try is Educational Administration Software. This company offers a three-phase package. The first level provides a data handler which allows the production of class lists, option groups, and alphabetical lists in a variety of ways. The same package provides conflict or 'clash' tables and a teacher database. Using this part of the overall scheme on its own allows the user to check on any combination of pupils' subjects. As the system will handle up to 120 staff and 400 pupils per year there are very few schools which could not be accommodated. Linking into this 'Basic Package' is the examination entry unit which allows rapid choice of pupils entered for any given subject and level simply at the press of a key. The manufacturer claims that the entire entries for a year group can be completed in one hour with this system. In addition, this same unit will provide a simple database of personal information on each pupil and will, with appropriate spacing, print the front page of a register. Form 7 may also be compiled using this system.

The final unit – timetabling – protects the user against mistakes by validating each entry and thus avoiding duplication of teachers, room use and activities. In future versions the package will also carry out the scheduling of the timetable, produce cover lists and give a full curriculum analysis.

Having seen this package in operation I can vouch for its ease of use. Its designer has many years of administration experience and is fully aware of the needs of the administrator. This package is most impressive and is improving all the time.

Over the past few months in the Education News page of *Acorn User* there have been outlines of administration packages available for schools. *Qadmin* from Hutchinson software (January 1986) is another fine attempt at integration. Powerful timetabling tools were

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mentioned in February's issue – *T-Squared* from Yorke House Software, *Nova-T* from Timetable Systems, *Timetable Tests* and *Construct* from Viztech and finally Keith Johnson (March 1986), who has forgotten more about timetabling than most people will ever know. His suite of timetabling programs is available from Hutchinson.

For a broader view of the issues raised by stand-alone machines in schools, the book by Patrick Bird called *Microcomputers in School Administration* is useful. So too is *Timetabling* by Keith Johnson – both from Hutchinson. There is a much greater development of all the issues raised in this article in *The Future of the Microcomputer in Schools* by Nick Evans, available from Macmillan.

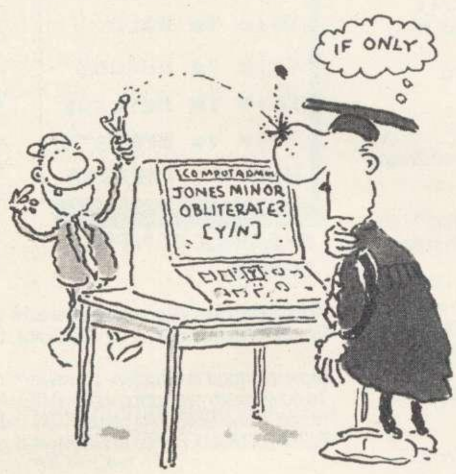
Networks – friend or foe?

The National Educational Resources Information Service (NERIS) is at present engaged in setting up a database of curriculum information and teaching resources which will be available nationally on an interactive network. The first areas to be covered will be maths, science, geography and personal and social development. This type of common resource base is going to be a feature of classroom computer use in the future, especially because of the generous offer from the Department of Trade and Industry of a free modem for every school. With such a facility the world is literally your oyster.

In administration terms, however, there are several caveats that need to be observed. First, the provision of systems nationally, presumably by national governments, is one thing. System control by the same national government is another. Two educationalists from Belgium moaned that their administration was the subject of continuous close scrutiny by national bodies. The phrase 'big brother' has crept into their language verbatim!

So why should this type of data be centralised? The answer can be looked at in two ways – regional networks and national networks. The regional network provides a common focus for administration (and other uses) within a commonly-governed area. Practices which are peculiar to that region and information which only has relevance within its boundaries may be accessed by institutions on this system.

The appeal to county administrators is that regional networks give an easy means of maintaining similarity of practice throughout all its schools. It also allows tasks such as statistical analysis to be undertaken with a minimum of paperwork. Moreover, central electronic mail transmission may be made of bulletins, job vacancies, changes in procedure, equipment exchange and the other widely-mailed information which is needed regularly by a local education authority. Information which schools need to access



often can be kept up-to-date on a database so all schools should have access to the latest procedures and guidelines.

Many people, however, feel that their records should be kept resident in the school rather than stored on regional databases. The reason for this is that they want to avoid misuse, no matter how well-intentioned, by administrators who for one reason or another like to compare statistics across the schools. Information such as examination results, pupil records, teacher records and the like are rightly the preserve of the school itself. What can be achieved regionally and nationally is the provision of powerful tools on-line to enable those records to be created and stored more effectively. National networks would provide a larger version of the service provided by regional networks. Interlinked management systems between the authorities and national centres would mean the speeding up of paperwork and the more efficient access of information at all levels.

Interactivity between users and system presents some problems of security. Levels of access to the system need to be carefully defined and methods of acquiring access would have to be sophisticated. Nonetheless, these problems are not insurmountable. Whereas at present schools subsist on a diet of paper administration it is likely that agencies such as NERIS, for example, will be utilised to create the structure for an information system which will revolutionise the way schools work. It should be pointed out that at present many schools and their individual teachers are using new technology to improve their own work practices. The sensible use of databases for class records or simple data-handling systems for option blocking provide us with a glimpse of future possibilities.

Teachers often complain that they spend far too much time on paperwork and social work and insufficient time on teaching: the computer presents a golden opportunity to help reduce part of that load.

What is needed now?

Although the government has made concerted efforts to provide equipment and is also setting up databases of curriculum and teaching information, there is still a need for an overall plan of computer integration into our education system. This plan should be compiled by an informed agency and it seems likely that new Microelectronics Support Unit would be able to fulfil that role. Such an agency would then be able to plan systems which gave true integration and minimised the need for boring repetitive work.

There is also an onus on schools to provide the information needed to set up such a system and to help define its requirements by sensible planning for the future. Clinging to old practices makes a nonsense of the idea that we are training pupils for the future. Unless our education service keeps up with industry, changes with the world – something which happens rapidly and with increasing frequency – and is willing to adapt itself to the needs of society it will crack under the strain. The future is nearly here!

PRICES AND AVAILABILITY

Administrator's Friend Basic package £90, examination entry £150, timetabling £150, full package £350
Educational Administration Software, Somerville House, Brunswick Road, Withington, Manchester M20 9GA. Tel: 061-445 1379

Qadmin £65
Hutchinson Software, FREEPOST 5, London W1E 4QZ.

T-Squared £40
Yorke House Sofware, Pendower Hall, West Road, Newcastle Upon Tyne NE15 6PP. Tel: 091-274 3620.

Nova-T £112.50 + VAT
Timetable Systems, 39 Somerset Road, Frome BA11 1HD. Tel: (0373) 63749.

Timetable Tests £24.50 + 50p p&p
Viztech, 11 Teasdale Road, Carlisle CA3 0HF. Tel: (0228) 35966.

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Simple to use, standard EPSON codes for Underline and Doublewidth used.

Multi-Font NLQ comprises of MFNLQ ROM for the BBC, and utility disc containing the FONT definer, ten fonts, BASIC demonstration program, VIEW demo text file and Driver.

After initialising Multi-Font NLQ with a 'MFNLQ' Multi-Font NLQ is normally transparent to the user. Multi-Font does claim some memory for workspace and storing font data.

Multi-Font NLQ is compatible with nearly all software, including most BASIC programs, VIEW, WORDWISE & InterWORD (SCRIBE & Printer Buffer software currently not supported).

Ten fonts are supplied or use the included font definer to create your own.

Fonts included:- Standard NLQ, Courier, Italic, Gothic, CompTS, Bold, Shadow, Outline, Broadway E. and Theatre.

Additional Font Disc MF 'B' contains:-

Hand, Script, Stencil, Broadway, Caps, Italic-Plain, Meccano, Plain, STD large, Wire and Inverse.

For Canon & Taxan Kaga users we recommend FONTAID in preference to Multi-Font NLQ.

Multi-Font NLQ (ROM and 40/80 Disc)	**£30.00**
Additional font disc 'MF-B' (11 fonts)	**£15.00**
P & P on MFNLQ	**£1.00**

This is Standard
This is COURIER
This is ITALIC
This is GOTHIC
This is COMPTS
This is BOLD
This is SHADOW
This is OUTLINE
This is BROWAYE
This IS THEATRE

EXAMPLE OF MFNLQ FONTS

FONTAID for the BBC

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NLQ Definer for Canon & Taxan Kaga NLQ Printers.

Design your own NLQ Fonts or 'download' one of our 40+ predefined fonts.

Fonts can be downloaded within Wordwise, Inter Word or VIEW Documents allowing different fonts to be used for different paragraphs, or even individual lines of text. During downloading your Program or Text will not be corrupted.

On the FONTAID standard font Disk are the following eight fonts:- Square, Outline, Italic, Gothic, Computer Type Style, Bold, Shadow, and Broadway Engraved.

Additional disc 'A' gives an extra 11 fonts including:- Greek/Maths, Plain, Hand & (Elite, Condensed, & Super Condensed).

Now included is a facility to issue '*' commands within a VIEW document. To download new fonts within VIEW documents, the FONTAID ROM needs to be fitted in the BBC. (All other FONTAID facilities are available on both the FONTAID ROM & DISC). Fonts are always downloaded from Disc.

Fontaid is recommended to Canon & Taxan Kaga owners in preference to Multi-Font NLQ. As downloadable NLQ is a built-in facility of the Printer, full access to all the printers control codes is still allowed. The resolution of the FONTAID NLQ is also slightly higher than that of Multi-Font NLQ.

FONTAID requires 6264 RAM chip in printer.

FONTAID ROM & STD Font disc	**£30.00**
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FONT ROMS	**£18.00**
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INFORM is a very powerful facility, which allows the user to display text information, of any kind, from Sideways RAM. This information can be readily accessed by using *I commands from the keyboard or from application programs. In this way, much information can be displayed on the screen without stopping the current task, such as entering text in WORDWISE or VIEW.

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A help manual can be created for your application, so that a reminder about more obscure points can be given to order.

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There are three Inform Data Files (I.D.F.), of often used information, supplied on the disk to give an indication of the use of INFORM.

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To use INFORM you must have Sideways RAM.

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C.J.E. BBC Printer Packs are £15.00 (e.g. CANON PW1080A with Printer pack £270 + £15= £285 everything included)

CJE Printer Pack software is normally provided on cassette.

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£5

CUTTING THE COST OF HACKING

Justin Lewis, of Brynmawr in Gwent, has sent in a neat little dodge to allow the off-line preparation of bulletin board screens (listing 1, right). The screen is prepared and saved to a file called "TEXT". When this routine is run, pressing a single key (@ in this listing, but you can change it) EXECs the file through your Beeb comms software.

The routine is started by an IRQ to detect a character entering the input buffer. If the character matches the chosen start command character, the string "EXEC TEXT" is forced and the CLI is called to interpret it. This acts as if "EXEC TEXT" had been typed from the keyboard.

Note that this is assembler code: it must be run in before you enter the comms package. Also, you must avoid using your chosen command character in general text entry, replies to prompts and so on, so choose it carefully with regard to your comms package.

Finally, as Justin pointed out, you must not boot your comms software by Shift-Break, as this will overwrite the EXEC routine.

£5

BEEB'S BOUNCING CURSOR

Peter Miller of Computer Software has sent in a program (listing 2 on page 179) which provides a very stylish alternative to the ordinary flashing underline cursor on the BBC micro. You can tell the touch of the pro in the technique. He has used the 6845 CRTC cursor extent registers to generate a block cursor which expands and contracts about the character centreline in the vertical plane . . .

This facility is only enabled in mode 7; other modes offer insufficient vertical resolution for smooth movement. Its major advantage is that it highlights the centre of the character, rather than the space below it, and its gentle motion is far less peremptory a prompt. (And it's something to look at while waiting for divine inspiration!) The bouncing cursor works perfectly with Basic, *Wordwise* and *View* (in mode 7), and no doubt with other text editors. If it interferes with any system, it can be relocated by changing 'mem' in line 80. A safe page should be chosen; if it is over-written the machine will hang up.

The program works by changing the cursor start/end registers of the 6845 CRTC (see p366/7 of the *Advanced User Guide*) in a 'start of vertical sync' event routine. The speed of movement can be changed with the 'speed' variable on line 120. As it stands, the routine will keep working through Break and CTRL-Break, but the lines 390 to 510 can be deleted if this is not required. Type *FX247 then press Break when you have finished using the utility.

```
   10 REM Acorn Forum
   20 REM Interrupt driven
*EXECer
   30 REM by Justin Lewis
   40 REM for BBC B/B+/M/E
with discs
   50 REM (c) Acorn User Au
gust 1986
   60 :
   70 FOR pass%=0 TO 3 STEP
 3
   80 P%=&C00
   90 [OPT pass%
  100 .start
  110 LDA #(prog MOD 256)
  120 STA &220
  130 LDA #(prog DIV 256)
  140 STA &221
  150 LDA #14
  160 LDX #2
  170 JSR &FFF4
  180 RTS
  190 \
  200 .prog
  210 PHA
  220 TXA
  230 PHA
  240 TYA
  250 PHA
  260 PHP
  270 \ Change to required
character
  280 CPY #ASC("@")
  290 BNE theend
  300 LDX #&30
  310 LDY #&0C
  320 JSR &FFF7
  330 .theend
  340 PLP
  350 PLA
  360 TAY
  370 PLA
  380 TAX
  390 PLA
  400 RTS
  410 ]
  420 NEXT pass%
  430 $&C30="EXEC TEXT"
  440 CALL &C00
```

Listing 1. Allows off-line preparation of bulletin board screens

£5

DON'T LOSE YOUR KEYPAD

A short routine (listing 3 on page 179) from Wandsworth provides a means of retaining the use of an add-on keypad to the Beeb, even after CTRL-Break.

The author, Roger Penniceard, has set it up to support the Quinkey 'chewing gum-shaped' keypad, but the principle is suitable for any user machine code driven device.

His notes are remarkably clear, so over to you, Roger . . .

In order to use the Quinkey the manufacturer provides an interrupt-driven machine code program (*WP* or *PROG*) which loads into the three pages above PAGE, then resets PAGE and sets up the interrupt service vector IRQ2V. However, whenever Break is pressed the vectors are reset and the Quinkey will not work. In addition, when it is used with *Wordwise* (though not *Wordwise Plus*), the text is also lost because PAGE is reset.

Listing 3, if run after *WP* or *PROG* has been run, will protect the Quinkey even after a CTRL-Break. It works by pointing the Break vector to the Quinkey start-up code.

£5

MASTER OF THE VDU

Hal Bertram of Sussex writes to say that the Master 128 allows VDU code parameter sequences to be abbreviated where the full sequence contains redundant zeroes (reserved for future expansion) . . .

Many of the BBC micro's VDU codes have a great many 0s reserved for future expansion. However, with Basic 4 running, you can terminate the codes with a '|' character, ie, whereas before:

VDU 23,1,0;0;0;0;

was required, it can now be replaced with:

VDU 23,1|

(the '|' immediately follows the number).

The '|' simply inserts 0s into the VDU queue until there are enough to process the command . . .

Nice one Hal, and let this be an example to us all: there must be tons of undiscovered features of the Master series, so keep on looking and sending your tips in.

ACORN FORUM

Listing 2. Gives you a stylish alternative to the ordinary flashing underline cursor

```
   10 REM Acorn Forum - Bou
ncing Cursor
   20 REM by Peter Miller
   30 REM for BBC B/B+/M
   40 REM (c) Acorn User Au
gust 1986
   50 :
   60 MODE 7
   70 *FX 13,4
   80 mem=&A00
   90 osbyte=&FFF4
  100 evntv=&220
  110 mode=&355
  120 speed=3
  130 :
  140 PROCassemble
  150 CALL start
  160 END
  170 :
  180 DEF PROCassemble
  190 FOR pass=0 TO 3 STEP
 3
  200 P%=mem
  210 [OPT pass
  220 .start
  230 SEC
  240 .set
  250 BCC exit1
  260 LDA #ecode MOD 256
  270 STA evntv
  280 LDA #ecode DIV 256
  290 STA evntv+1
  300 LDA #14
  310 LDX #4
  320 JSR osbyte
  330 LDA #1
  340 STA count
  350 STA pos
  360 STA dir
  370 LDA #&F7
  380 LDX #&4C
  390 LDY #0
  400 JSR osbyte
  410 LDA #&F8
  420 LDX #set MOD 256
  430 LDY #0
  440 JSR osbyte
  450 LDA #&F9
  460 LDX #set DIV 256
  470 LDY #0
  480 JSR osbyte
  490 .exit1
  500 RTS
  510 .ecode
  520 PHP
  530 PHA
  540 TXA
  550 PHA
  560 TYA
  570 PHA
  580 DEC count
  590 BNE exit2
  600 LDA #speed
  610 STA count
  620 LDA mode
  630 CMP #7
  640 BNE exit2
  650 LDA #10
  660 STA &FE00
  670 LDA pos
  680 STA &FE01
  690 LDA #11
  700 STA &FE00
  710 LDA #18
  720 SEC
  730 SBC pos
  740 STA &FE01
  750 LDA pos
  760 BEQ bounce
  770 CMP #9
  780 BNE next
  790 .bounce
  800 LDA dir
  810 EOR #&FE
  820 STA dir
  830 .next
  840 LDA pos
  850 CLC
  860 ADC dir
  870 STA pos
  880 .exit2
  890 PLA
  900 TAY
  910 PLA
  920 TAX
  930 PLA
  940 PLP
  950 RTS
  960 .vars
  970 ]
  980 count=vars
  990 dir=vars+1
 1000 pos=vars+2
 1010 NEXT pass
 1020 :
 1030 REM Checksum
 1040 total%=0
 1050 FOR byte%=mem TO P%-1
 1060 total%=total%+?byte%
 1070 NEXT byte%
 1080 IF total%=15803 ENDPR
OC
 1090 PRINT"Checksum error
 - please check listing"
 1100 END
```

Listing 3. Retains the use of an add-on keyboard (in this case Quinkey) even after a CTRL-Break

```
   10 REM Acorn Forum
   20 REM Prevent loss of QUINKEY
   30 REM by R M Penniceard
   40 REM (c) Acorn User August 1986
   50 :
   60 REM q=&119 for WP
   70 REM q=&10B for program
   80 :
   90 osbyte=&FFF4
  100 p=PAGE-&300
  110 REM Check if WP or program used:
  120 IF ?(p+6)=ASC("W") THEN q=&119 ELS
E q=&10B
  130 FOR pass%=0 TO 2 STEP 2
  140 P%=p
  150 [OPT pass%
  160 JSR p+q
  170 LDA #&F7
  180 LDY #0
  190 LDX #&4C
  200 JSR osbyte
  210 LDA #&F8
  220 LDY #0
  230 LDX #(test MOD 256)
  240 JSR osbyte
  250 LDA #&F9
  260 LDY #0
  270 LDX #(test DIV 256)
  280 JSR osbyte
  290 RTS
  300 .test
  310 BCS reset
  320 RTS
  330 .reset
  340 JMP p+q
  350 ]
  360 NEXT
  370 IF q=&10B THEN ?(p+&13F)=&60
  380 CALL p+3
  390 CALL !-4:REM Break
  400 END
```

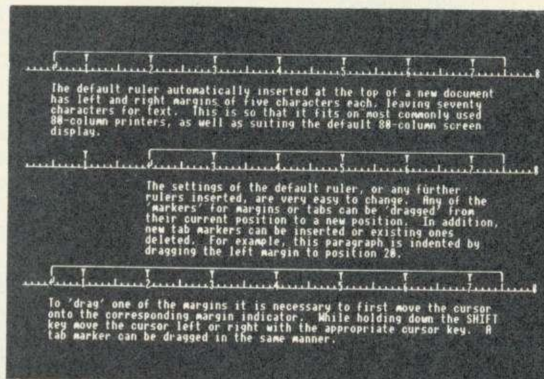
INTER-WORD

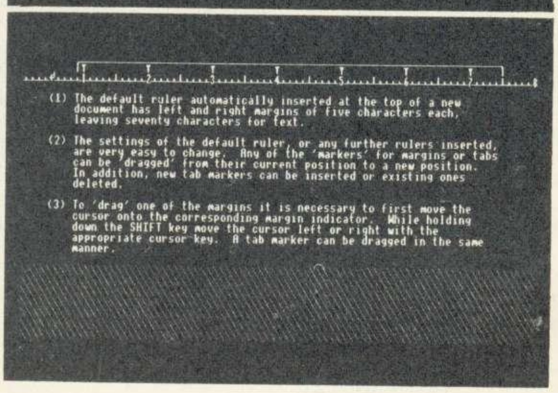
INTER-WORD is the ultimate word processor for the BBC micro. Just look at its features:

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The ROM-LINK suite, of which INTER-WORD is an important part, is a uniquely flexible set of integrated ROMs, compatible with all models of the BBC micro.

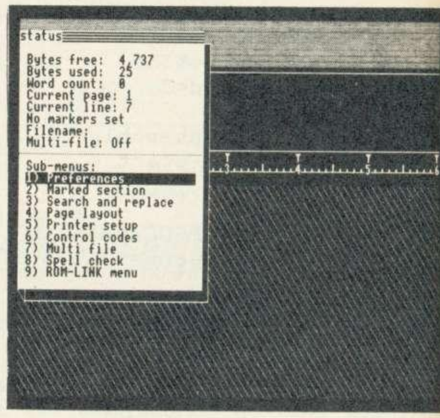
MONEY-BACK

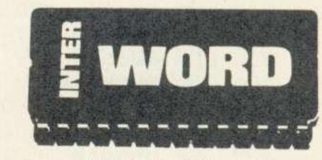
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INTER-WORD is 32K long (longer than any other BBC word processor)—BUT—due to a unique design, it is supplied in just ONE CHIP compatible with all machines.

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INTER-WORD

INTER-WORD shows an accurate image of the final printed text during editing. It is continually re-formatted as new text is entered, so ensuring that the screen always accurately represents the final document. Justified text is also shown while editing; this includes left, right and fully justified and centred text.

The layout of text is controlled by rulers. These are extremely easy to insert and just as easily changed to give a different format. Any aspect of the ruler can be changed by 'dragging' its position marker using the cursor keys. No description can do justice to the intuitively simple ruler editing.

Although embedded commands are little used in INTER-WORD, some embedded commands are still allowed and may be 'hidden' in the text without upsetting the screen format, appearing only if they need to be edited. ANY codes for ANY printer can be included at ANY point within the text. Standard effects such as bold and underlining are shown on-screen. A simple printer code menu allows codes for any printer to be easily included.


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Documents may be edited in any of 40, 53, 80 or 106 column screen modes
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Printer setup to allow simple access to any printer effects on any printer.
Pull down menu driven throughout. Menus exist for printer setup, page size, preferences, spelling check, status, etc.
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INTER-WORD is 32K long (longer than any other BBC word processor) - BUT due to a unique design, it is supplied in just ONE CHIP compatible with all machines.

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ROM-LINK programs can all hold their data in memory simultaneously. In fact, each may hold more than one set of data. This means that INTER-WORD can cope with more than one document in memory at once.

Data may be transferred from one program to another with the minimum of effort. A spreadsheet may easily be transferred to INTER-WORD and re-arranged to suite the format of the document. Similarly a spreadsheet set up in INTER-WORD may be directly imported into INTER-SHEET.

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Page 1

Multiple-column printout facility is an integral feature. After setting the text width to suit one column and setting the number of columns, printing out is just a matter of pressing a key.

INTER-WORD uses a similar method of marking sections of text to WORDWISE. This provides a simple and very effective means of moving or copying any section of text to any other position in the document. However INTER-WORD has extended the marked section idea so that it may be centred or underlined or emboldened etc.

Comprehensive search and replace functions are included. The search and replace strings are stored so they may be used again and again. The user has the choice of case dependent searches or not. Wildcards are allowed.

INTER-WORD is very easy to use. Page format, preferences etc. are controlled from a series of pull down menus. Incorrect settings are impossible to enter, being rejected before they can cause a problem.

The latest computers make use of menus in the same way as INTER-WORD. There is no need to remember long lists of commands or values which may follow them, all options are shown on the menus.

For example there is a 'preference' menu. This allows easy selection of screen colour, key repeat rates, screen mode, whether TABS and CR are shown on screen or not, etc. There is a comprehensive 'printer setup' menu. This controls things like the number of copies printed, the number of columns, the line spacing etc.

Another menu is for control codes, so that the codes for underlining, bold and other screen effects may be set for any printer.

Saving and loading is performed via a file selector menu which lists the filenames and allows selection by name or by moving the cursor. Once tried, any other method of entering filenames becomes a real chore.

Most functions are controllable by one or two key presses as an alternative to menus. This allows users to choose whichever option suits their preference and experience.

There is even a menu giving direct access to the associated SPELLING CHECKER ROM expected to be released later this year. This will be an entirely ROM based checker with over 50,000 words on chip ensuring that it is extremely fast. It also allows user defined dictionaries on disc or sideways RAM.

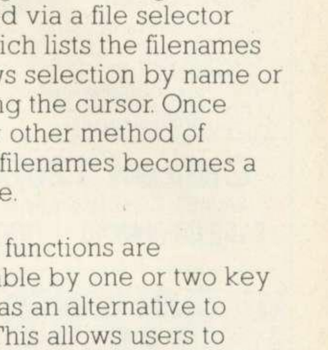
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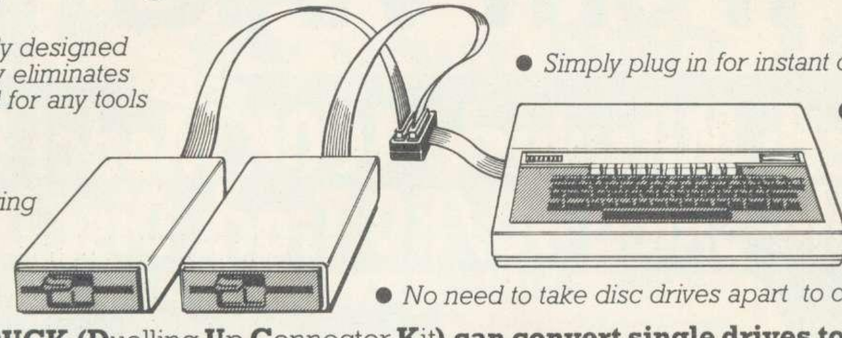
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- *No soldering*



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- *No mess*
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The Viglen DUCK (Dualling Up Connector Kit) can convert single drives to duals, instantly!

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- Postage and packing **£2.50** inc. VAT.
- *Official Orders from Government and Educational Establishment welcomed.*

Viglen

Orders to: Viglen Computer Supplies
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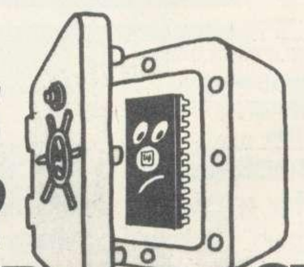
Credit Card holders may order by telephone: **01-843 9903**

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Same cartridges can also be used on the Master, with special Viglen adaptor – out soon

YOUR ROMS WOULD BE HAPPIER IN A VIGLEN ROM CARTRIDGE SYSTEM



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The safest way to look after your growing collection of ROMs is to store them in Viglen's specially designed cartridge systems, this not only keeps them happy, but also removes the risk of damage to your BBC micro.

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ADVANTAGES OF VIGLEN ROM CARTRIDGE SYSTEM

● All cartridges are gold-plated for durability and reliability, unlike others which are only silver plated. ● No need to switch machine off between cartridge changes. ● Insert and remove 'Wordwise' 'View' 'Disc Doctor', etc., at will, from your micro in absolute safety. ● Low, low power consumption unlike other systems. ● Save on memory.

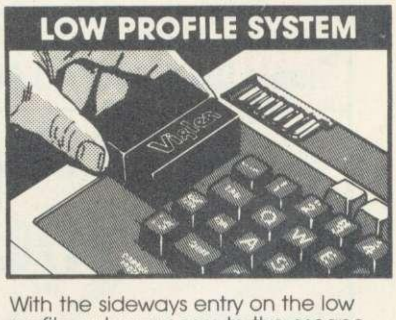
THE STANDARD SYSTEM

Over 50,000 sold



The Standard System used extensively in education is preferred, due to its robust construction and ease of use.

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With the sideways entry on the low profile system access to the escape and tab keys are slightly restricted. However Viglen betters its rivals in this respect by being 3mm lower.



PRICE FOR COMPLETE KIT, including 1 cartridge, 1 Cable Assembly, 1 Blanking Off Plate (used if system is removed), 1 Socket Cover (used when no cartridges are resident), 1 Cartridge Storage Rack. **£15.95**

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AA64

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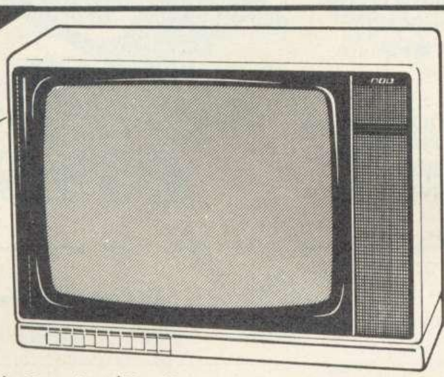
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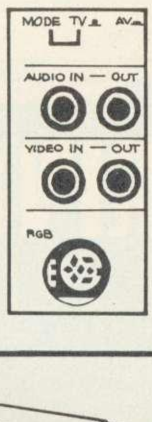
NEW

PHILIPS Colour TV/ Monitor Model 1114



14" Tube (V34cm) Receiver/Monitor

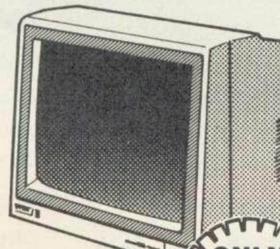
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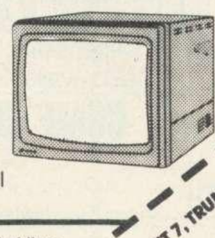
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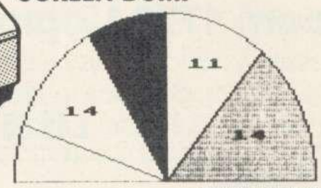


SAMPLE OF NLQ
(NEAR LETTER QUALITY)

```
The quick brown fc
jumps over the laz
The quick brown fc
jumps over the laz
The quick brown fc
```

ACTUAL SIZE

SAMPLE USING EPSON SCREEN DUMP



NOT ACTUAL SIZE

Standard features include enlarged, condensed, emphasized and double strike print modes as well as subscript, superscript and underlining capabilities. Ease-of-use paper handling includes ten-inch fanfold, cut sheet and rolls.

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Tick ✓ whether ☐BBC or ☐IBM

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Win on every count, with a Viglen Winchester Drive for your BBC Master Series 128k or BBC B or B+

FREE 8 MBYTES

100% ACORN ADFS COMPATIBLE

SPECIAL OFFER FOR ACORN USER ONLY – 28 MEGABYTES FOR PRICE OF 20 MEGABYTES £759 INC VAT

£759

MUST USE COUPON BELOW

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Acorn 1770 Upgrade Kit

Enables you to run your BBC B with the floppy discs in double-density ADFS Mode. **£49.95** inc VAT



Compability

The Viglen Winchester is ready to plug in and use straight away on a BBC Master Series. On a BBC B or B+, you will need to fit the Acorn ADFS Rom. Viglen believe this is the only truly 100% Acorn ADFS compatible unit currently available. You can use up to two floppy disc drives in conjunction with the unit. Fit the Acorn ADFS to the B+ and the floppies can double their capacities by running in double density mode.

Speed

The Viglen Winchester takes under 2.5 seconds to save 200KBytes, making it at least 10 times faster than the equivalent floppy disc system.

Memory

The Viglen 20Mb Winchester is equivalent in capacity to two hundred 100K floppies or fifty 400K floppy discs.

What is a Winchester?

A Winchester Drive is a sealed unit containing one or more hard discs and works in principle like a floppy disc drive. The discs are permanently rotating at high speed so giving a much faster access time. The discs cannot be changed, but with such a vast memory capacity, it is not usually necessary to do so.

The Viglen Winchester Unit consists of the following:

1 Winchester Drive, Controller Board and special designed power supply and fan – all fitted in one compact case fan cooling is essential for all Winchesters. **2** Acorn ADFS Rom **3** Acorn ADFS Manual **4** Acorn ADFS Utility Programs **5** Winchester User Guide **6** Additional Utilities on the Winchester including Formatter and Verifier.

The dice must be loaded in favour of

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Please send me (quantity)____ Winchester Drives. I own a ☐BBC B, ☐B+, ☐Master, ☐BBC B with 1770 DFS ✓ **Tick**
I own a Master and would prefer a Master ref. manual 1 instead of the Acorn ADFS kit ☐
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FREE ADS

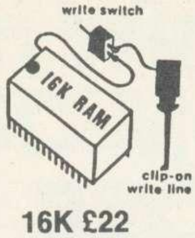
EPSON 40 track, 100k per side disc drive. Also P-40 thermal printer. Any offers? Phone Darren, weekends after 6pm. Tel: (0482) 507524.
ICL letter quality printer with keyboard, £75. Honeywell dot matrix printer, £125. Both used with BBC. P/ex above for BBCB. Tektronix 561A scope, probes, manuals, £125. Tel: 078-42-51409.
PRINTER for sale, Tandy DMP-110 can be seen working connected to my Beeb, £140. Tel: Peter on Northampton (0604) 401419, evenings.
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ELECTRON owner seeks pen pal to swap ideas, hints, tips, software. Any replies. Reply to Colin Hughes, 32 Wheatlands, Halton Brook, Runcorn, Cheshire WA7 2DS.
DISC DRIVE 100k 40 track SS full height Shugart. Not used since overhaul. 'Health' certificate. Utils Discs, £40 ono. Tel: Smarden (023377) 629, Prestel Mailbox 023377629.
WOULD YOU? like to buy my BBC Micro model B, and tapes all for £299. Tel: St Albans 57413. Ask for Graham.
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WANTED for Acorn Electron, the cassette of "Scrabble". Tel: (Tony) 041-248 4756 (office hours).
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ACORN 6502 Z80 second processors and IEEE interface, also Torch Z80 card for sale. All in vgc. Sensible offers only. Can demonstrate, deliver within Midlands area. Please Tel: Stafford (0785) 213831, (Peter).
ACORN Electron plus software, joystick, manuals and books, £55. (Slogger) ROMBox, six months old, £30. Other software includes Beach-Head, Repton, Repton 2. Also books. Tel: (0332) 517947, evenings. Buyer collects or pays postage.
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ACORN 0.90 and 1.2 DFS ROMs for sale £10 each. Tel: Romsey (0794) 517971, evenings only.
EPSON MX80 printer, VGC, leads & manual, £120. Grafpad Graphics Tablet, new, £50. Bigears speech recognition system, only £20. 5in colour TV, good display, £20. Tel: David, evenings on Dartford (0322) 29666.
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HELP! Screen dump routine needed for Brother HR5 printer. A. M. Dalglish, 98 Etne Crescent, Bishopbriggs, Glasgow G64 1EY.
BBC B 52k Aries B20, Wordwise plus View, InterSheet, Disc Doctor, Acorn Teletext adaptor, 200k twin drive various software monitor, £750 ono. Edwin Kunz, 24 Ochil Road, Aiva, Cacks, Scotland. Tel: 0259 60924.
FOUR week Acorn Electron plus brand new tape recorder plus leads plus £100 worth of games plus tape rack, £95. Tel: Lyndhurst 3347.
BBC USERS wish to start user club. Please send full details of all equipment held to: (RBMCC) Rochdale, BBC Micro Computer Club, c/o 6 Dunbar Grove, Darnhill Estate, Heywood, Lancs OL10 3QJ.
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BBC B with dual 800k disc drive, Kenda double density DFS with utility disc. All manuals including BBC basic programming book. Sell for £580. Tel: Formby 78854.
FOR SALE: BBC model B with Basic 2, Wordwise, View, Acorn speech upgrade, double density disc interface and advanced user guide. £400. Antony Stone, 60 New North Road, Huddersfield, West Yorkshire. Tel: (0484) 539441 (daytime).
BRITISH micro graphpad + pen + manual – £80. Original Acorn graphics ROM – £19. Original Beebugs Toolkit ROM – £19. 128k Eproms – £4.95. Quad FM tuner – £80. Roger – evenings. Tel: 061-799 9845 (Manchester).
BROTHER CE 50 typewriter fitted with computer interface socket. Cost £325, hardly used. Can be used as daisywheel printer. Includes two typeface wheels. Tel: 051-727 7594 after 3.00 pm.
HELP. Could anyone loan me the manual from Island Logics "Music System". I was sold the package with my micro with no manual. (Copy will do). Tel: (09252) 6328, between 5-6pm weekdays.
OPUS 3 in disc drive double sided software switchable, £75 only. Cumana 5¼ in disc drive 100k single sided £25 only. Tel: (021) 557 9521 during office hours (Dave Harris). Or (0922) 692258 after 7pm.
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BBC-B with Basic 1.2, 6502 second processor, manuals, software, Quickshot joystick, adaptor, cassette player and leads worth £750. Accept £450. Will split. Immaculate condition. Buyer pays postage. (Barnstaple) 0271 74151. After 4.30 pm.
WANTED BBC disc owners to exchange ideas and software. Phone (Rhyle) 0745 38094.
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SHARP MZ-700 64k computer software, catalogues, built in data recorder, only £50. Phone (04892) 5943.
STATE OF THE ART – ½ height disc drive double sided 200k, leads and manual included £80 ono. Tel: (Leeds) 0532 732468. After 6pm.
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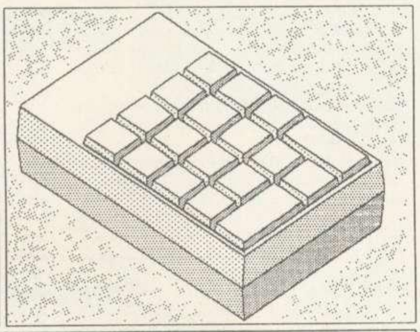
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ACORN AB USER'S

DIARY

No hi game for Botham

Contrary to popular rumour, Tynesoft – publishers of *Ian Botham's Test Match* – are not working on a 'hi' version of the game, reports Dick Athalon, *Acorn User*'s sports editor.

Possible damage to second processors may be one reason. A rambling technical editor of our acquaintance has warned that repeated playing of such a game could result in severe loss of memory, although he couldn't remember why.

Extra features included a random captain facility: Shift-C-Break selected a new captain at the beginning of each game.

The current version of the game features a one player mode, which cricket pundits believe to be a very realistic simulation of England's technique, as is the lack of a practice mode.

On yer bike

Following a severe bout of lunch fatigue and pointed comments that he should 'get on his bike', *AU* boss Tony 'Zorba the Greek' Quinn was last seen heading out of the office in the general direction of France.

He is now believed to be burning up the autoroutes towards Cannes on his new company bike – a brand new Raleigh Turbo GTi with tinted water bottles.

Meanwhile, while the cat's away . . .

Still birth for 'Baby Beeb'

More rumours, this time of a new medical micro from Acorn, have been shot down in flames by a company spokesperson.

It seems that hard-pressed maternity units had been asking for a computer to help with deliveries. As a result, Acorn came up with the 'Baby Beeb'.

Electrical devices like computers can create safety problems, so one notable feature of the new micro was a special 'auto-cremate mode' where the micro bursts into flames when it hits a bug.

It seems there was a problem with the built-in battery. The current drain from the incendiary devices was so great that the micro needed four car batteries. But the problem may not be insoluble. A mole at Acorn told us: 'We think we may have mastered the battery problem to produce a more *compact* version.'

We kneed to know

We are anxious to trace the owner of these knees, and a reward is offered for correct information. We have reason to believe they belong to a regular contributor to *Acorn User*.

From the pattern on the tie we managed to trace the culprit's old headmaster, Mr Eddie Kayshun, who remembered the knees but couldn't quite place the chin. 'He was the only knock-kneed, bow-legged boy I knew,' he told us. 'What this country needs is more of his type.'

If you think you can put a name to these knees, write to: 'Kneed-to-know', c/o the Acorn Abuser office. The first five correct entries will receive copies of the August listings disc. Closing date is the end of August.





Kitty looking down on the Editor

End of an era as Dear Kitty defects

The publishing world has been stunned by the news of another high-level defection. In a world where WYSI(never)WYG, defections are commonplace. But this one has hit close to home.

Lured by the bright lights of Soho and the promise of all the luncheon vouchers she can eat, our own Dear Kitty has gone over the wall.

The news will come as a shock to those poor, bug-ridden souls whose only lifeline, and sometimes last resort, was the Dear Kitty column.

It's the end of an era. Never again will we be treated to the sight of Kit CATing her disc or BOOTing her micro (usually just before she realises it isn't switched on).

Comments from around the office included 'Who's making the tea now?' from *AU* supremo Tony Quinn and director Mike Potter's soul-searching question, 'Kitty who?'.

Readers wishing to pay their last respects may attend the Drinking-in-State at the Acorn User Exhibition at the Barbican Centre in London on the Saturday and Sunday sessions.

Even though her desk is now empty there will always be a corner of some *AU* office that is forever Kitty.



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